The Builder.

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Formal Gardens.

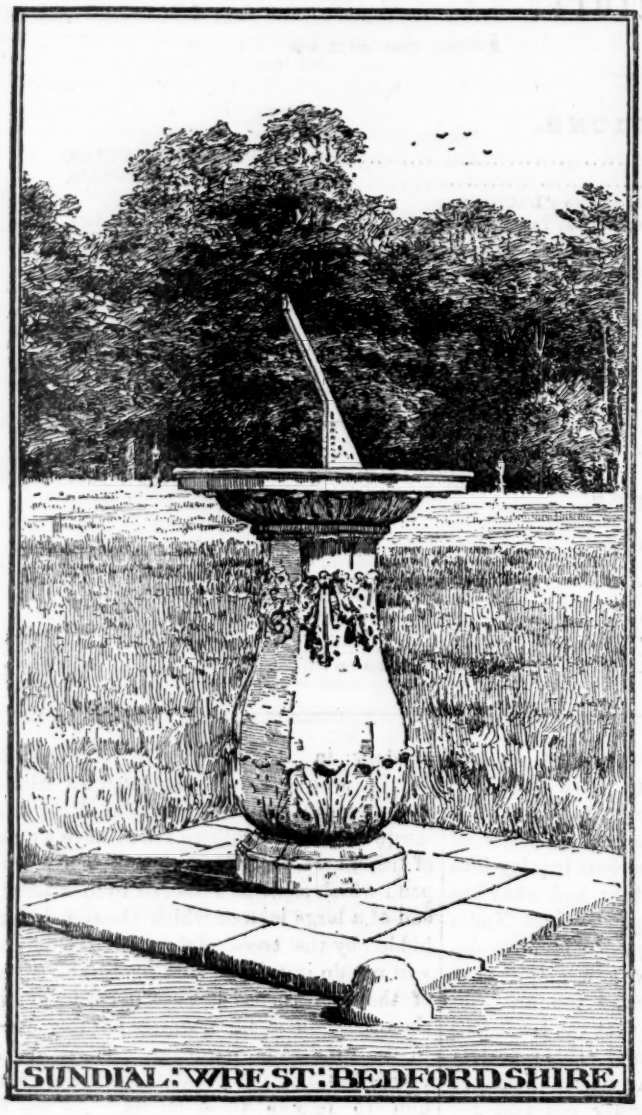
THE appearance of another book on gardens by an architect* is a further instance of the interest now taken in this subject by the members of the "art or profession" of architecture, and of a growing determination on their part to have the design of the garden, so far as it is connected with a building, in their own hands. Mr. Blomfield's book, however, though a small one in size, is not to be considered quite on the same platform as the late J. D. Sedding's "Garden-craft," which we noticed a short time since. Sedding's work, charming and suggestive as it is, is more a rhapsody than a treatise from which any principle or aim can be deduced; it was obviously written quickly and easily, and, as we observed at the time, though delightful reading, there is not much to be learned from it. Mr. Blomfield's book, begun we believe a good while before the other, is closely reasoned and gives evidence of a considerable amount of study of the older literary works on the subject. The illustrations, reproduced from sketches by Mr. F. Inigo Thomas, are very pretty examples of book-illustration on a small scale. Four of them, by the kindness of the publishers, are reproduced with this article.

The main object of the book is to recommend the treatment of the garden in connexion with a residence as a piece of design, on more or less architectural principles, and to discredit the principles and practice of the landscape-gardener. This latter personage is doing penance, and is likely to do penance for some time to come, in all treatment of the subject by artists. He has had, it must be admitted, a very long innings, has imposed himself on society in a triumphant style, and has little right to complain that it is his turn to be shunted. Nor need landscape gardeners, as a race, altogether despair of the resuscitation of their mystery, though not in the present generation. Many have been the changes in fashion in regard to gardens, followed dutifully by wealthy planters of parks, without any too curious inquiry into the philosophy of the matter; and what has happened before may happen again. Nor is it certain that landscape gardeners have deserved all the abuse they now get, or that formality may not be carried too far. But for the present it is clear that the landscape gardener will have to stand aside; society having (as they say of an officer dismissed from the army) "no further occasion for his services."

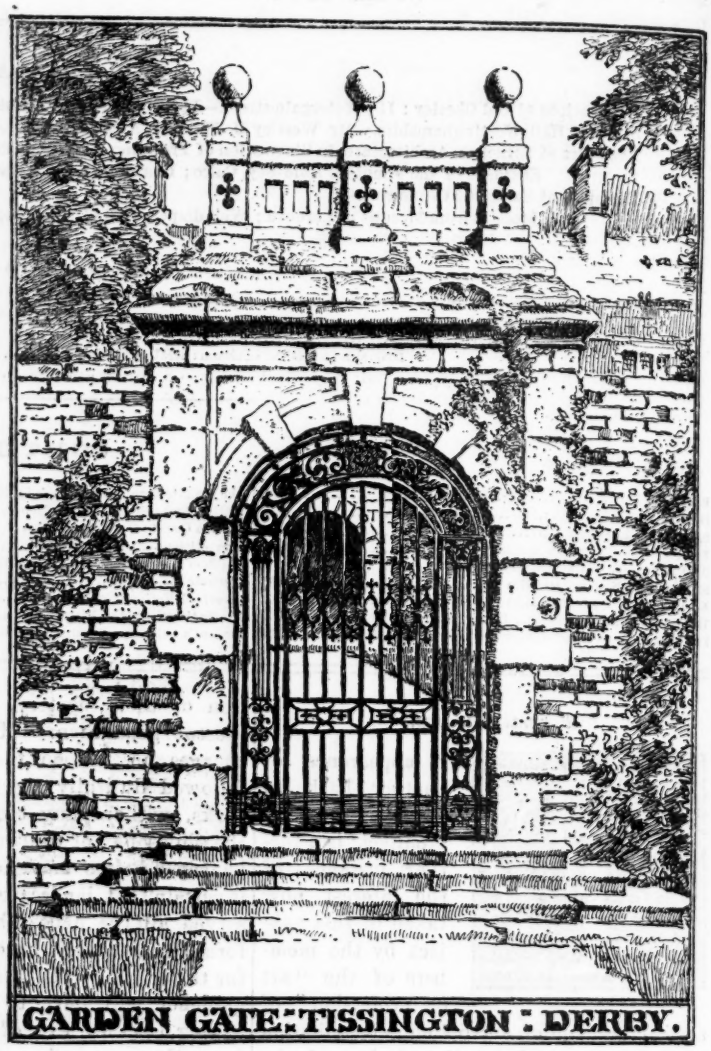
The main sins of the landscape gardener are twofold. First, that he deliberately adopts the principle of the false or imitative picturesque; secondly, that he ignores the architecture of the house, and designs his garden quite irrespective of it. The first is the more heinous offence of the two, as involving a broad principle of falsity. Because Nature in her irregularity of woodland and glade is charming, we are to make artificially a similar irregularity in the garden. Paths are to wind about as if in accidental meandering, and clumps of trees or bushes are to be carefully, but as if carelessly, placed here and there to give colour to the windings of the walks, as if they were compelled to bend from their course to avoid obstacles which have been purposely contrived beforehand. There is not the slightest difference in principle between this process and the now exploded one of making artificial ruins, which was current in the last century. Because the ruined remains of part of an old abbey are picturesque and suggest poetic association with the past, therefore, if there are no genuine ruins about, we may deliberately create some. The common-sense of the present day revolts at this; but it is only the same principle carried further. The only real difference lies in the fact that the sham ruin is a palpable imposture built up of artificial materials, while the sham landscape is created of materials which are in themselves the work of nature, though artificially disposed, and the imposture is less easily seen through. Once seen through, its charm, if not gone, is at least largely discounted. Besides, there is nothing of a professional mystery in it, after all. Anyone can do it who chooses to exercise himself in that way. Any one can plant his garden irregularly, and say, here I will have a clump of trees, here a winding walk, here a piece of pond which shall be arranged to look like the end of a large lake of which the remainder is hidden by the trees. Of course the amateur will not do it quite according to the devices of the professional landscape gardener; but then those devices are worth nothing except to the landscape gardener. They are his creed, but not ours, unless we tamely allow him to impose them on us. As we had occasion to remark when reviewing a landscape-gardening book some little time since, we are told certain trees must be placed in a certain way, &c.; but *why* must they? Simply that it is the landscape gardener's notion, which has nothing to do with either nature or art, but is a kind of hybrid concoction in obedience to arbitrary rules. It is his way of doing the trick; but if we do not want the trick at all, what then?

There may no doubt be such a thing as judiciously clearing out or planting up a park for certain ends of effect; but a park is not a garden. The essential error in treating a garden in this mock-natural manner, as stated by Mr. Blomfield, is of two kinds; in reference to what is outside and what is inside the garden; the landscape without and the habitation within (for we are considering the garden specially as an appanage of the habitation). As regards what is without, it is no business of the garden to imitate or blend with that; the garden is an enclosed space or "paradise," separated from the wildness of natural landscape, and intended as a place of retirement for man, in which he may follow the bent of his own devices and make a design after his own pleasure. Now a design which pretends not to be a design merely stultifies itself. As Mr. Blomfield observes "Any one who loves natural scenery will want the real thing; he will hardly be content to sit in his rockery and suppose himself to be among the mountains." A garden is an artificial enclosure, and what we look for in it is an artificial design and not an attempt to make it look like nature. And this argument has double force when we consider that the garden is

* "The Formal Garden in England." By Reginald Blomfield and F. Inigo Thomas. London: Macmillan & Co. 1892.



SUNDIAL: WREST: BEDFORDSHIRE



GARDEN GATE: TISSINGTON : DERBY.

immediately connected with the architecture of the house, which is necessarily an artificial design. A house growing out of a "wilderness" is a thing out of place, coming abruptly out of the ground, with nothing to lead up to or form a base to it. The laying-out and planning of the garden should have a direct reference to the style and to the laying-out of the house. It is a pendant to the architecture. In the mock-natural landscape garden it is impossible this can be the case, for the characteristic of this type of garden is a studied irregularity: the clumps of trees must be disposed as if to persuade the eye that they naturally grew there; the walks must take all kinds of apparently accidental curves and windings. There is something absolutely repelling to the architectural eye in the plan of one of these gardens, with its walks deliberately laid out in broken-backed curves.

There are certain points, no doubt, in the book before us, which are pressed a little too far, both in the direction of formality and in the condemnation of informality. It may be questioned (as indeed Mr. Blomfield hints) whether the title "The Formal Garden" is altogether the best one, the word "formal" having an acquired secondary sense which is the reverse of complimentary; though we are not prepared to suggest a better title for the present purpose. But the tendency of some of the examples and of some of the remarks is a little too much in favour of a degree of artificiality in the garden design which some may think deserving of the worser meaning of the word "formal." Mr. Blomfield condemns indeed the sheer pattern-making of the Dutch system, observing that the votaries of this style seem to have forgotten that, after all, a garden was a thing compounded of natural growths, of herbage and flowers. But he appears to defend the artificial clipping of trees rather further than we should be disposed to follow him. It is quite true, as Mr. Blomfield says, that it is really no more unnatural to clip trees than to clip grass; but to clip them into imitative shapes is another matter, and though the author admits that this was carried to excess under William and Mary, he seems to have a kindness for it which we cannot feel. It is interesting and pleasant in the garden of an old house, where it belongs to and recalls the taste of the period to which the house belongs, and has an association of old times about it; but we should be very sorry to see it revived in modern gardens. It is an artificiality precisely the opposite to that of the landscape gardener, and (to our thinking) equally false in taste. We doubt whether even the cutting of shrubs or small trees into purely geometrical shapes, such as cones and obelisks, is not over formal. At all events it is certain that a garden treated with this extreme degree of symmetry requires fine weather and warm sunshine to look at home; it is a melancholy spectacle in winter. Then again we are disposed to think that some place may be found for landscape-gardening, on a small scale and without an actual pretence of naturalness, in gardens which have no connexion with architecture; those which form a secluded portion of a park for instance. Mr. Blomfield is sarcastic over Battersea Park, which we always thought rather a wilderness of a place; but the enclosed quasi-garden portions of Birkenhead Park, which have no relation to any architecture, but are merely secluded portions railed off from the open park for special treatment, realise a very charming effect with their plantations and small glades and water, which can hardly be said to pretend to pass for natural, though irregular in their lines; and we doubt whether a treatment of the whole as a single formal garden open to the eye at all parts would have given as much pleasure or beauty, on the whole, within such a confined space of ground. The vice of twisting the water about so as to carry it out of sight from every point of view is a piece of trickery, certainly, that cannot be defended, nor the use of a bridge where one could as easily walk round the end of the pond; but (in spite of principles) it is a very pretty spot. Then we think also that the author rather fails to recognise the real merits of Repton, who lived in a bad day and practised in a bad style, but who may be called a genius in his way, and was at least far above his immediate predecessors and followers in power and perception in dealing with estates according to the method then in vogue. Mr. Blomfield talks of Repton having ruined this and that place; but we do not feel quite so sure about this; and in regard to his sins in cutting down avenues, it should be remembered that it is one thing to admire one fine avenue, and another to go, as Repton did, all over the country from one "seat" to another, and find everywhere the eternal avenue, as if nothing could be done without it. At all events, we do not think Repton was a man to be dismissed with a sneer. A man may be a genius, though working in a bad style. There is no doubt Bernini's style was execrable; Adam's was formal and tame; Street's Gothic Law Courts are a mistake; but Bernini, Adam, and Street were all remarkable men in their way, and so we take it was Repton.

To return to the book before us, the second and third chapters give an interesting historical sketch of "The Formal Garden in England," in which a great deal of curious antiquarian information, illustrated from various old prints, is compressed into a small space, followed by a chapter on "the end" of that institution, accompanied by the sarcasms of Pope and the mild fatuities of Addison. It is perhaps hardly correct to say that Milton of all men loved the formal garden. His

"trim gardens" suggests the idea, but in his later great poem he makes it one of the beauties of Paradise that the scene had nothing to do with "nice art" but with "nature boon,"—

Wild without rule or art, enormous bliss."

"Enormous" is no doubt used in a quasi-Latin sense, the absence of *norma* or rule. The succeeding chapter deals with "Courts, Terraces, and Walks" in a fashion partly historical, partly critical. Concerning the critical portion we entirely concur in the importance of a terrace near the house, as a base for it to rise from, and in the fine effect of a "fore-court," now too often represented only by the carriage "sweep" and the oval of green grass in the centre of it. The charm of the fore-court of Ham House we alluded to not long since. Fully do we agree also in the recommendation of a liberal breadth for walks. Nothing more tends to give meanness even to an otherwise stately garden than cramped and narrow proportions in the walks. A charming specimen of the fine effect of the fore-court in a comparatively small and unpretending mansion is given in the view of Ambrosden (fig. 25).

In the following chapter on "Knots, Parterres, and Grass-work," we hope that we are not intended to admire the examples from Markham, with the apparent interlacing of the borders, as bad in garden design as German "interpenetration" in architecture: but we do not notice any protest against it. In regard to grass-work it is suggested that the lawn-tennis court presents some opportunities,—

"that is, if the scale given by the dimensions of the court itself are" [query—"is?"] "sufficiently adhered to, and the features introduced are kept sufficiently large and simple. To make the court a really valuable part of the garden it is not enough to lay out a sufficient expanse of grass, which loses itself at the earliest opportunity in shrubs and flower-beds. The court should be taken as a definite problem, and designed as an integral part of the garden. And this applies to all grass-work. The mistake of the landscapist is that he considers grass only as a background, not as a very beautiful thing in itself. Grass-work ought to be designed with reference to its own particular beauty. The turf of an English garden is probably the most perfect in the world, certainly it is far more beautiful than any to be found on the Continent, and even the French admitted this two hundred years ago. It is wilfully throwing away a most valuable means of delight to treat grass-work as a mere affair of haphazard convenience."

In the chapter on "Fish-ponds, Pleaching, arbours, Hedges" &c. the author refers to the decline of the old fish-pond under the influence of Le Nôtre, to make way for the vast sheets of water which formed an essential feature in his system. "Great canals and basins took its place, and the transition from this to the artificial lakes of the landscape-gardener was easy." The long canal form of ornamental water is however to our thinking a very fine incident in a garden; it has this advantage over a broad sheet of water, that it gives distance and perspective of water-reflections without interfering with the sense of repose, enclosure, and privacy in a garden. The view given of the canal-like fish-pond at Wrest, with its parallel lines of thick hedge on each side, forms a charming example of this. "Pleaching," a revived old English word, signifies, according to the author, "the trimming of the small boughs and foliage of trees or bushes to bring them to a regular shape"; but we doubt if this is the old meaning. Walker's dictionary gives "to bend, to interweave," with the note "obsolete"; but Lord Tennyson (who, though not a dictionary-maker, is one of the first authorities on the true use of old English words) revived it in a well-known passage which confirms Walker's reading—

"Round thee grow, self-pleached deep,
Bramble-roses, faint and pale,
And long purples of the dale."

Mr. Blomfield distinguishes it from "plash," "which refers to the half-cutting of the larger branches and bending them down to form a hedge." We rather think it will be found that "pleach" and "plash" are two forms of the same word. The illustrations, from Markham's "Country Farm," of hedges cut into elaborate ornamental outlines at the top, are curious, but we should have liked to have seen them condemned; the weak garden-owner may take them as models, to the astonishment and alarm of his visitors.

Chapter viii. is devoted to the interesting and fruitful subject of "Garden Architecture," on which a book might be written; books have indeed been written on it, and bulky ones, but no good one that we know of; they are mostly advertisements of designs for lodges and entrance-gates. Many remains of old garden architecture are delightful in their combined dignity and simplicity. "Rustic bridges" were unknown in those better times. The two great stumbling-blocks are rusticity on the one hand, which is quite out of place in the formal garden,—it is the landscape gardener's pet "fad"; and "classic" pretension on the other hand; gardener's lodges in the shape of Greek temples, &c. These are not out of keeping with the garden so much as with the purpose to which they are put, making them cottage-homes inside and temples outside. Gate-piers in the seventeenth century are well worth study; the same general idea runs through many of them, but constantly varied in little details, though without any attempt at strange or sensational

GATE PIERS: CANONS ASHBY: NORTHANTS

treatment. Canons Ashby, of which we give an illustration, is a good example; notice the admirable effect of the consoles at the back of the piers, breaking the harsh angle between them and the wall. Tissington gate is a characteristic specimen, but to our thinking owes its picturesqueness rather to age and association than to the actual merit of the design: it would look rather bald and heavy if executed as a new work in freshly-hewn stone. The gate from Pitmidden, Aberdeenshire, of which an illustration is given in the book, with its double returned flight of steps and the fountain-niche in the centre of the inner retaining wall, and the gate-piers flanked by a short length of balustrade on each side, is one of the pleasantest examples of the combination of simplicity, dignity, and picturesque character in this kind of work. The sundial is one of the most beautiful and suggestive features that can be introduced in a garden; we give the illustration of the one from Wrest. In regard to statuary, we think Mr. Blomfield is right in condemning marble for this country; it is only suited to a bright southern climate, and gets stained and looks unhappy and starved in a rainy climate. Portland stone is preferable, but the author especially recommends the revival of the old use of lead for such garden statuary, which weathers into a silvery grey, rather improving than deteriorating with time, as far at least as appearance goes. We give the example of the little leaden cupid from Melbourne. Statuary is a beautiful addition to a garden; but let it be good statuary. Nothing is more easy or more fatal than to put up commonplace reproductions of well-worn works.

In the concluding chapter are some remarks on the treatment of gardens in London squares which deserve special consideration. A London square, the author observes, is an entirely artificial affair, bounded by rectangular blocks of buildings.

"In Bloomsbury, till within the last few years, there existed a good old-fashioned square garden, laid out in four simple grass plots, with a lime walk and a border of flowers running round the sides. It was restful and pleasant to look at. The grass plots were good for lawn-tennis and the lime walks kindly to the citizen; but the landscape gardener appeared on the scene and speedily put all this to rights. He cut up the grass plots and destroyed two sides of the lime walk, and heaped up some mounds, and made the most curiously unreasonable paths; and then charged a handsome sum for having destroyed one of the few Square gardens in London with any pretence to design."

We think we know the garden, and sympathise. The present treatment, with its feeble "mounds," is puerile. But there is something to be said on both sides, where a wealth of tree foliage exists. Has Mr. Blomfield ever noticed the effect of the mass of foliage in Brunswick-square gardens on a bright day in spring or early summer? We doubt whether any parterre would compensate for that.

In regard to one point touched on in the general criticism of landscape-gardening in the earlier part of the book, we do not quite agree with the author in condemning the idea (carried out, as he observes, by Barry in his well-known scheme at Trentham) of treating the park immediately outside the garden enclosure in a partially formal manner, so as to lead out by stages to the informality of natural landscape. It may be carried out so as to appear too pedantic and contrived, but there is something in the idea. Hampton Court is an example. Outside the semicircular fence enclosing the formal garden we have only trees, meadows, and water, but trees and water laid out in formal avenues and canals. The contrast with the formal garden within the fence is quite sufficient to mark off the garden as the more artificialised portion, and we should certainly

LEAD FIGURE OF CUPID MELBOURNE: DERBY.

lose a fine palatial effect in the loss of the formal arrangement of the avenues and canals.

One other criticism we have to make. Had Dante lived in the age of printing, he would

certainly have had a place in one of the circles of his "Inferno" reserved for authors who issue books without an index, who would probably have been condemned for ever to search for references which they could not find. By his prudence in living after Dante, Mr. Blomfield has escaped this inconvenience; but we hope an index will be added in the next edition.

NOTES.

AT the meeting of the Hellenic Society on Monday last an interesting paper was read by Professor Percy Gardner, on "the Chariot Group of the Mausoleum," the object of which was to suggest that the two nearly perfect statues discovered by Sir Charles Newton among the other remains on the mausoleum site did not form part of the quadriga group on the top of the pyramid. That the statues do in all probability represent (according to their accepted nomenclature) Mausolus and Artemisia, Professor Gardner admits, but denies that they were placed in the chariot. The following are his principal arguments: Pliny describes the chariot but makes no mention of portrait-statues; such statues would probably not be placed at such a height that the portraiture would be lost, and even the figures themselves hidden behind the group of horses; the attitudes of the figures do not suggest the driving or controlling of horses, nor is the dress of the man such as would be worn in a chariot; and (which seems the most important argument) the figures are too small in scale for the wheel and the horses. The wheel of a chariot in Greek sculpture is usually about half the height of a man, and when figures are combined with horses, the figure is almost always, if not always, about the same height as the complete height of the horse, up to the top of the horse's head. These conditions of proportion would have required the figures to be about 14 ft. high, whereas in fact they are respectively 9 ft. 10 in. and 8 ft. 8 in. Mr. A. S. Murray, who is now engaged in setting up the remains of the quadriga and the figures in relation to one another (which was perhaps the reason the paper was read), replied in favour of his view, his most important arguments being that the stratification of the marble was similar in all the fragments, showing that they had come from the same locality in the quarry and presumably had been worked together; and that there is a break in the side of the statue of Mausolus just about the height where the chariot rail might be supposed to come. There is, of course, also the fact that the statues and the quadriga fragments were found close together on the site, but Professor Gardner replied that this, as is known in other instances, is no certain criterion as to their relative situations on the building. A glance at the remains, since the meeting, convinces us at least that Professor Gardner's argument about proportions is valid. The statues are decidedly too small in scale for the fragments of the horses; they would be thought so even in modern art, still more in Greek art, where the horse is always smaller in comparison with the human figure than in modern art. Mr. Murray's arguments must not be overlooked, but if the figures did belong to the quadriga they were out of scale to a degree of which we believe there is no other example in Greek art. If, however, these dignified and highly-finished statues were not in the place which has been supposed, there appears to be no fitting site for them in Pullan's restoration of the Mausoleum, so that the question affects the architectural as well as the sculptural restoration of the monument. We may take the opportunity of observing that two things are much wanted at the Hellenic Society's meetings, viz., ventilation and punctuality. Of the former there is none; and as to the latter, the meeting is always kept waiting from ten minutes to a quarter of an hour after the stated time, before the chair is taken.

THE subject of "Stained Glass" drew a large meeting at the Institute on Monday evening, and the large collection of diagrams of stained-glass designs exhibited was an element of considerable interest; but nothing very new was said about stained glass either in the papers or in the discussion, in spite of a return to the old and (we thought) exploded system of "calling on" selected speakers by name. This system certainly has the one advantage that it stops the mouths of certain irrepressible gentlemen who are always wanting to hear the sound of their own voices, but otherwise it is a principle rather at variance with freedom of discussion, and its advantage was not very obvious on Monday night, when one artist admitted that he had nothing to say, and another appeared to think the chief object of the meeting was to hear him speak, and had eventually to be stopped by the Chairman. Among points which might have been noticed in discussion and were not, we may call attention to the unfortunate suggestion made in one paper, that for the treatment of the extremities of the figure in stained glass we should study Botticelli, *i.e.*, conventionalise some one else's convention. Certainly the wiser course would be to begin at Nature and do our own conventionalising so far as it is necessary. Among the remarks made on iron work not a word was said about a point that has excited a good deal of controversy in some quarters lately, whether the heavy supporting iron work should not rightly be *outside* the window and not in, and be so treated as to be a decorative feature externally; a view of the matter on which there is a good deal to be said. There are, we believe, Mediæval examples of this. Another matter which requires criticising, and to which not the slightest reference was made, is the perpetual repetition in stained glass of details imitated from stonework; the eternal "canopy" which seems to sum up the idea of so many designers for filling up the head of a window, and which is not only uninteresting but is entirely unfitted for glass work. Now and then we see a window in which there has been some attempt at the design of an ornamental filling specially suitable for glass, but in the majority of cases it is just the same recipe, the figure of a saint in coloured robes below, and the imitation architectural canopy above. Stained glass should have its own forms of ornament, which are essentially distinct from those of architectural masonry. Speaking of the coloured robes reminds us, too, how little attempt has been made, and how much might be made, to adapt the idealised or conventionalised nude figure to treatment in glass, in combination with decorative detail. All these matters might have raised points for really new discussion, in place of some of the rather worn-out enthusiasm about "jewelled effects," &c., of which we have heard often enough by this time.

A FACULTY has been obtained (as recorded on another page) for the removal of human remains from St. Helen's, Bishopsgate, with which it is impossible to deal otherwise, with proper regard to sanitary precaution. This course will probably have to be adopted in other city churches from time to time. It is natural that descendants of those who have been interred in a church and to whom monuments have been erected in it should feel grieved at the necessity, but there are cases in which it is a necessity, and sentiment must give way to sanitation. We hope the same course will be taken with the remains under St. Mary Woolnoth, instead of adopting the insane project of pulling down this, one of the most characteristic buildings in London, which has been mooted in some quarters. The absurdity is the greater inasmuch as, even if the church were destroyed, the mass of human remains would have to be removed all the same, for the safety of the city.

IT has long been held that section 157 of the Public Health Act, 1875, which authorises Local Sanitary Authorities to make By-laws with respect to certain structural arrangements of new buildings, does not authorise the making of a By-law with respect to the height of rooms, and, accordingly, in the Public Health Acts Amendment Act, 1890, a section (No. 23) has been introduced extending the powers under the Act of 1875 so as to enable any Sanitary Authority, after having formally adopted the Act, to make By-laws with respect to, *inter alia*, the height of rooms intended for human habitation. In many old codes of building By-laws a clause has been introduced with this object; but, owing to its having been declared by the Law Officers to the Crown to be *ultra vires*, it has been used only with the greatest caution. Such clause has usually prescribed a minimum height for any habitable room, and has then prescribed a further minimum height for any habitable room situated either wholly or partly in the roof. There is obviously much inconsistency in determining, for purposes of health, a minimum height for any room intended for human habitation and immediately afterwards fixing a smaller minimum height for another room intended for the same purpose but happening to be in the roof of the building. If a certain minimum height,—say, 8 ft.,—is requisite in order to secure adequate breathing-space in a room having a rectangular section, it is clear that a similar height throughout only half the area of the room when situated in the roof must be inadequate, and yet this is what has commonly been demanded. Now that the Legislature has specially authorised the making of by-laws for regulating the height of habitable rooms, the subject has received the consideration of the advisers of the Local Government Board, and a memorandum signed by Dr. George Buchanan, F.R.S., the Medical Officer of the Board, and Mr. Gordon Smith, their architect, has recently been prepared for the guidance of those sanitary authorities who may contemplate making such a By-law. It is recommended in this mem. that the minimum height for a habitable room should be 9 ft., though 8 ft. 6 in. is regarded as permissible, and even 8 ft. would not be refused; but it is suggested that no By-law proposing less than 8 ft. of height should be submitted for the Board's approval. For rooms in the roof it is pointed out that no part of any room should be less than 5 ft. in height, thus doing away with the unsatisfactory arrangement of having part of the floor so circumstanced that the sloping ceiling under the rafters comes down to meet the floor at an acute angle; there must be, in attic rooms intended for human habitation, vertical sides at least 5 ft. high. For the rest the room must be of such a height as will give a mean height over the whole floor-area of not less than 8 ft., or whatever greater height may be determined upon. There can be no doubt that more decisive legislation on this subject is called for, and it is to be hoped that the point will receive attention in framing the new Metropolitan Building Act.

THE action of the Amalgamated Society of Engineers, in regard to the strike in the North, has been condemned in outspoken fashion by some of the affiliated societies. Although the dispute is now affecting some 18,000 men,—the majority of whom are idle against their will,—the engineers stubbornly refused to submit the question at issue to arbitration, until unusual pressure was brought to bear upon them by the Federation of Engineering and Shipbuilding Trades of the United Kingdom. This body urged them to show more willingness to come to a peaceful settlement, and, although they were at first told that their advice was "a scandal to trades unionism," it eventually received more reasonable consideration. Happily, the Unions are not all so averse to conciliatory measures. The following passage occurs in the last "Monthly Report of the United Society of Boiler-makers and Iron Shipbuilders":—"Let us always, if possible, ad-

just our differences by peaceful means; and this is possible in ninety-nine cases out of every hundred if there is a desire to do so." The desires of the disputants in this case have inclined in quite an opposite direction, and the interests of their employers have been so entirely ignored, that the latter have been goaded into adopting a rather uncompromising attitude. Messrs. Palmer & Co.—at whose yard the dispute arose,—have had to send work away from Jarrow to Glasgow for H.M.S. *Revenge*, and other work is in like manner being lost to the district. In accepting a proposal from the societies interested for a conference, the employers have stipulated that the discussion must take cognisance of the original dispute; whereas the engineers characteristically desired it to be confined, in the first instance, to the lock-out, which was really the inevitable outcome of that dispute.

THE case of Hart *v.* The Monarch Land Company, Limited, tried this week before Mr. Justice Mathew and a special jury, shows the difficulty in which owners of property are placed when they have to rely solely on the opinion of experts. The action was brought to recover damages for injuries done to the Star Music Hall by the erection of some model dwellings which abutted on the east wall of the hall, and which, by placing too great weight on this wall, caused the front wall to crack. On the one hand, various architects and surveyors state that in their opinion the cracks were caused by the defendants' buildings. On the other hand, an equally numerous body of experts asserted that in their opinion the causes of the damage were certain defects and weaknesses in the wall itself. Each of these adverse opinions was, no doubt, put forward quite honestly; the mistake which professional witnesses make is in adhering too confidently to matters of opinion as if they were matters of fact. It is this which brings professional witnesses into disrepute. In the present case, the jury agreed with the plaintiff's witnesses, or it may be they gave him the benefit of the conflict of evidence. When in doubt, find for the plaintiff, is a maxim dear to the juryman's heart. But such a dispute as this ought to have been kept out of the law courts: a competent architect with a judicial mind might surely have settled the matter after an examination of the buildings.

THE London School Board have again been in litigation against one of the builders of their schools, on the ground of fraud and wilful deviation from the contract. The result was a verdict for the defendant. Nothing could be more ill-advised than to claim damages on such a serious ground as this without very complete proof. Mere carelessness, however reprehensible, is entirely different from fraud. The contract in question made the builder liable for four years if fraud and wilful deviation could be proved. It is businesslike for a public body to have a clause making the builder liable for bad workmanship and materials for a stated period after the end of the contract, for the deviation from the contract is not always ascertainable. But it is thoroughly unbusinesslike to bring actions for fraud unless there is proof positive; to do so in an uncertain manner is simply to throw good money after bad.

WE have repeatedly expressed our opinion that London, in considering its future water-supply, ought to aim at finally abandoning direct supply from the Thames; and in support of this opinion from the medical point of view we may draw the attention of our readers to the following remarks in the last issue of the *Lancet*:—

"While recognising to the utmost the value of modern improvements, we find ourselves unable to abandon our old belief that the Thames affords a most unsatisfactory water-supply. The Thames drains a large and highly populous area, and pollutions of all kinds pass inevitably into it. Every storm of rain carries down in muddy streams the washings of towns, villages, manured fields, and pigstyes. In spite of all care human sewage certainly finds its way into the stream even at distances not far above the intakes of the great companies. At the mouth of the Wey, close to Shepperton, a cluster of houses with cesspools certainly pollute the water, for the cesspools fill during flood time and empty as the water recedes. Such at least was the state of things at the time of our last inspection, and we have no reason to suppose that any change has been effected. This, at all times unpleasant, might evidently become a source of urgent danger if a single case of cholera or choleraic diarrhœa occurred in one of the cottages. In the same way barges and even house-boats, in spite of the prohibitions of the Thames Conservancy, might evidently and at any time communicate some deadly pollution to the water-supply. London would then be protected only by the filters, and surely nobody would drink with comfort water which, having received the cholera virus, had been purified solely by passage through sand. As to other pollutions, we have ourselves seen the putrid bodies of dead dogs floating in the river within half a mile above the intakes of the companies."

PROFESSOR HAMMER has been making an investigation of the different slide rules in the Stuttgart Technical School, and has published the results of his inquiry in the German surveyors' organ, *Zeitschrift für Vermessungswesen*. For simple multiplications or with multiplications with three factors, the 25 centimètre slide rule gives an approximation of within about 0·1 to 0·2 per cent. of accuracy. Professor Hammer tested a number of German celluloid slide rules, and found the mean error in simple multiplication to be $\frac{1}{800}$ with rapid reading. The less portable office slide rules in use in Germany are the 50 centimètre slide rule, giving an accuracy of 0·08 per cent. with rapid reading; others of various dimensions, such as the Landsberg 723 m.m. long; and Beyerlens calculating circle, which represents a length of 754 m.m., and with which the accuracy is 0·07 to 0·05 per cent. The Fuller and Thacher rules are used in England and the United States respectively. Mr. Hammer made careful tests with the former, with the result that it was found to give a mean error of 0·008 per cent., which showed that the accuracy claimed by the makers, — *i.e.*, $\frac{1}{10000}$ is not too much. Still, more nearly accurate results were obtained with the Thacher rule, the mean error with careful adjustment being 0·0031 per cent., or approximately $\frac{1}{32000}$ with careful reading.

THE Middlesex County Council intend to enlarge, at an estimated cost of 20,000*l.*, the Council Chamber and Sessions House at the Westminster Guildhall. The present octagonal building, of brick with a stone Doric portico, was erected in 1804-5, after C. P. Cockerell's designs. The site is that of a meat market, built in the Sanctuary in 1751, and which had been established, as we read, as early as 1568. It appears, too, that the market stood over part of the foundations of the Sanctuary church, whose remains, supposed to be of Edward the Confessor's time, were drawn and described by Dr. Stukely,—see *Archæologia*, Vol. I.* Maitland (1756) gives an account of "a prodigious strong stone building . . . . 72½ ft. the length of each side, and the walls in thickness no less than 25 ft.," and identifies a portion of it with the bell-tower which Edward III. built here for the use, it appears, of the Minster.. This is "the strong clochard of stone and timber, covered with lead," mentioned by Stow as having been erected in Little Sanctuary by that sovereign. For the bell-tower they removed the outer staircase at the church's south-eastern angle, and built another on the eastern side, as shown in the drawing and plans made by Stukely. Part of the fabric was afterwards converted into the "Three Tuns" tavern; all above ground had disappeared by the year 1760. The original "Quaker" tavern gave place to an extension of the market area.

AT a sitting of the Consistory Court, in St. Paul's, on the 18th inst., Dr. Tristram, Q.C., Chancellor of the Diocese, granted faculties in respect of certain London churches. The works for restoring St. Helen's, by Mr. Pearson, R.A., reveal the existence of a large amount of human remains beneath the floor, which we gather is to be replaced with another and levelled. It was stated that of 4,335 interments during the period 1652-1883 one-third were made inside of the church. In view of Dr. Sedgwick Saunders' evidence, and the opinion of the medical adviser to the Home Office, the Court agreed to issue a faculty for a removal, generally, of the remains to the City of London Cemetery at Ilford, or elsewhere, as may in particular instances be desired, but with exception for non-interference with the McDougal (1835), Robinson and wife (1599, 1592), and Sir Julius Cæsar (1636) vaults, upon representations by the respective relatives and descendants. The exception extends also to the Sir John Spencer (1609), Sir William Pickering and his son (1542-74), Sir Thomas Gresham (1579), Sir John Lawrence (Dame Abigail, 1682), Sir John Crosby, and Sir Francis Bancroft (above ground, 1723: he died 1726) vaults and tombs.* Towards the cost of the repairs, calculated at about 7,000*l.*, the Merchant Taylors, as patrons, contribute, we believe, 2,000*l.*, and the Charity Commissioners 4,092*l.* out of the common fund set up under the City of London Parochial Charities Act, 1883. Another faculty, following that of August 18 last, for laying out and planting the churchyard of St. Botolph-without-Aldgate, provides for the non-disturbance of the Sidney family monument (1801), and for the levelling and filling of the John Gibbon vault (1765) at the north end, with the removal of the memorial slabs to against the church wall. In the case of Christ Church, Spitalfields, Dr. Tristram said he would grant a faculty—its conditions to be based upon a visit he would make to the ground—for converting the graveyard into an open space, in pursuance of a resolution of the Vestry, passed last December, to profit by the Metropolitan Open Spaces Act. It was stated in Court that the Metropolitan Public Gardens Association are prepared to expend 450*l.* upon the work.

THE Dudley Gallery Water-Colour Exhibition is not a very interesting one as a whole, but contains some works of marked character. Among these are Mr. G. Marks's very beautiful little landscape studies, which give the idea of large paintings reduced to a small scale (Nos. 192, 193, 197, 200, 201); "Lengthening Shadows" (201) the smallest of all, an evening view in a harvest field, is particularly fine. Among larger works Mr. J. Carlisle has a fine landscape, "Until the Evening" (21), a cold spring sunset with a ploughed field in the foreground; "Allington Gorse" (42) is another good work by the same hand. Mr. Sidney Evans exhibits two small drawings of Eton (81 and 87) of very artistic quality; Mr. Henry Bailey's "A Rich Harvest" (92) is fine in sentiment and composition, though rather weak in handling; Miss Skidmore's "The Glow of Eventide" (136) is fine in feeling, and Mr. Fulwood's "Whispers of Gloaming" (150) is noticeable for colour. Mr. Harry Goodwin is rather palpably imitating the style of his brother in some of his views of special localities, such as "Winter Sunset, Hastings" (341), in which however he is not much behind Mr. A. Goodwin, and his "Lucerne Twilight" (162), more in a style of his own, is one of the most striking pieces of colour in the room. We rather quarrel with Mr. F. G. Coleridge, in his various sketches about Salisbury, for not doing more justice to the cathedral; in the "Canon's Garden, Salisbury" (172), the building, which occupies a considerable part of the middle distance, is incorrectly and very weakly treated, becoming a mere wash of brown, and there is no indication (otherwise) of any mistiness in the atmosphere to excuse

* His view, with plans, of the upper and lower churches are reproduced in Allen's "London." 1828.

* The dates are those of the deaths of the persons named. For an account, with illustrations, of their monuments, and of the church, see the *Builder*, March 15, 1884, and June 29, 1889.

this silhouette kind of treatment. Signor Giampietri, as usual, treats ancient architecture admirably, especially in his "Roman Forum, Remains of Fourth Century" (110), which is perfect as a representation of antique remains of this class. Mr. Barnett Stuart has some interesting representations of ancient architectural remains in various parts of the world,—"Temple Gateway, Kioto" (129), the "Sanchi Tope" (186), the "Caves of Ellora" (224), and the strange scene of the "Approach to Ming Tombs, Pekin" (343), with its elephants and other creatures rudely carved on either side of the road, like a burlesque on the Egyptian avenues of Sphinxes. Mr. T. A. de Moleyns has some "colour notions" in his slight sketches of foreign town scenes, but the best, the "Rath-Haus, Basle" (137) is spoiled by the buildings being out of perpendicular. Mr. W. Tyndale gives a good architectural picture in "Pont Flamand, Bruges" (138); Mr. L. Block's studies of old books (158, 163) are admirable bits of still life; and the studies of shipping by Miss Nora Davison—especially "A Farewell Visit" (69) and "From the Far North" (90),—show great truth of perception, and a very original style of handling. We have not too many good painters of shipping (as distinct from sea), and Miss Davison seems to have a style and handling of her own in this class of subject.

WHILE Londoners grumble (often in a very exaggerated strain) at the inaction of municipal authorities in clearing away snow, it appears that the Parisians have had an opposite reason for complaint. According to a sarcastic paragraph in *La Semaine des Constructeurs*, the energy of the "Ponts et Chaussées" in washing away snow by the application of jets of water has threatened to render Paris a kind of Venice:—

"On a canalisé le boulevard Saint-Germain, la rue de Rivoli, l'avenue de l'Opéra, toutes les grandes artères où commencement déjà à circuler des bateaux . . . . d'ailleurs à fonds plats; le service de navigation est chargé de l'entretien de ces voies. On ajoute que les phoques du Jardin d'Acclimatation vont être dressés sous la haute surveillance du sympathique directeur de cet établissement, M. Geoffroy St. Hilaire. On les destine à trainer la gondole du Président de la République. L'administration compte sur un effet saisissant."

THERE appears to have been a very odd kind of critical objection raised in Glasgow on the passing by the Town Council of the draft Building Regulations Bill in its final form. The complaint is that the Bill will raise the cost of house building. Of course it will; who ever heard of a Building Regulation Bill that did not, if it were worth anything, raise the cost of house building? The necessity for such Bills arises from the tendency of speculating builders to build as cheaply and as badly as possible, and it is to prevent them doing so for the future. The champions of the existing state of things in Glasgow speak with sympathy for the poor builders, who wish to build houses that will pay. No doubt they do, but they are not to indulge this desire at the expense of the public health. The public pays in the long run, not the builders; and the Glasgow public, if it has any common sense, will be willing to pay higher for better and more sanitary building.

CANTERBURY CATHEDRAL.—The Dean of Canterbury writes to the *Times* (Wednesday) in regard to what is being done at the Cathedral:—"The north and south walls of the nave of Canterbury Cathedral have for a century and more been out of the perpendicular, each leaning slightly outside, from the pressure of the roof. When a new roof was put upon the nave, forty or fifty years ago, much was done to correct the pressure, but some months ago we asked Mr. Christian, the architect of the Ecclesiastical Commissioners, carefully to examine these walls and see if they had moved at all. He reported that they were perfectly safe and had not moved, but that it might be as well to brace them together for more perfect security. He gave us drawings for the braces, which are now being put in position, and will tie the two walls together. What we are doing is thus simply a matter of precaution."

SARACENIC ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

IT will now, I think, be opportune to give a general review of Saracenic architecture. When I proposed to take up this subject, I intended to include Ottoman architecture, but I felt that in one sense Ottoman architecture should not be included, for though certain Saracenic forms and ornament were retained, it was in fact a branch of Byzantine architecture. Most of the early mosque builders at Constantinople, after the Ottoman conquest, were Byzantines, and when they were not, the main problem the architects had to solve was to improve on the methods adopted at Sta. Sophia; so that in reality it would be extraneous to the main purpose of these lectures.

The research into the origin of Saracenic architecture has been the cause of a certain satisfaction to me in respect to our art,—I use the word art in its most comprehensive sense, just as we speak of the art of the goldsmith and the potter. The Saracens in a century could conquer more of the world than ever belonged to the Egyptians, Chaldeans, the Persians, the Greeks, or the Romans, but with all their resistless energy, and with most of the architecture of the world before them, they could not for four or five hundred years elaborate a Saracenic style; in spite, too, of an influx of wealth, and of a demand for buildings, that was unprecedented. I do not think they were great constructors. At least there seems to be nothing that they built which could vie with the domes and vaults of Rome, or the dome of Byzantium. And in point of durability their works seem to have fallen short of those of Greece, Rome, and Persia. They do not appear either to have originated any great novelty or advancement in what I may call constructive planning. They added a few distinguished picturesque features, and they perfected,—we may almost say invented,—a new scheme of decoration. We know nothing of the causes that produce architects, or poets, or astronomers, but we fancy that certain conditions will produce architecture, and all, or almost all, these conditions were found in the Saracens. They were more magnificently generous than any people of whom we have any knowledge,—in fact, to be called generous was, in their eyes, the summing up of all the virtues. At first they were ascetics, but at a very early period, after their emergence from Arabia, they gave up asceticism, and were more celebrated for the gorgeous magnificence of their buildings, dress, houses, and furniture, than Persian kings or Byzantine emperors. Founding mosques, hospitals, khans, and fountains, were looked on as claims to paradise, and, when the rulers were Turks, they were great tomb builders. Free education was as great a programme with them as it is with us, and the meanest freedman, or the poorest beggar, was admitted to the Society of Kaliphs and Emirs, if he was a Hadji, a holy man, or was distinguished in the arts or sciences. Many of Kaliphs cultivated the arts and sciences with success, while music and poetry excited the most passionate enthusiasm in all the Saracens. There was, too, in the mind of every Moslem a strong belief in the marvellous and the weird, in all sorts of spiritual beings, good, bad, and indifferent; in astrology, in incantation, and in amulets and talismans. Hidden treasures of fabulous values must have been common, when a wealthy world had been conquered in less than a century, so a shrewd man might easily get a reputation for his divining rod, talisman, or incantation; and with what wonders had this simple people been confronted; many of them had seen the deserted or buried temples of Egypt, the deserted palaces in Persia, the sculptured caves in India, and fountains of fire. The strange beasts, birds, and fishes of many countries had met their eyes, and they were familiar with the learning of Greece, Rome, Egypt, and India, not to speak of glimpses of the Chinese.

Bactria which they conquered was a Greek Kingdom, and even to this day, it is said, that half the words of the Afghan tribes are ancient Greek. Many of the Saracens had visited Ceylon, Sumatra, Java, Borneo, and probably the islands of Japan, if not Australia itself. Homer had been read, for we find the cannibal of Sumatra, called Fenioun; evidently the shot of a Saracen at Polyphemus. Early people can no more copy than children can; certain strong characteristics strike both savages and children, and both only portray, as well as they can, the salient features that have struck them. This trait appears to me to be very characteristic of the Saracen style, and we must allow something for national characteristics and personal proclivities. Striking features they had seen in the architecture of the countries they had conquered were used in a new way, and where the Moorish element was largely mingled with the Saracen, as in Spain, a passion for vague outline is a marked characteristic, and all else was derived from the profound study and love of geometry; this, however, seems to me to have been chiefly confined to ornament; they seem to me never to have worked out a logical style irrespective of ornament. One part of Kalaun's mosque is almost purely Romanesque, another small piece is Gothic; the later mosques, if you exclude the ornament, are two-storied warehouses or mansions with lines of recessed windows; and this seems to me the most persistent type. When they made a grand success, as at the mosque of Sultan Hasan, they did not make continued efforts to perfect it. I admit that this would have been difficult to improve on; as it is, it looks like the isolated effect of one genius.

We learnt from Abd-al-Rahman himself that the aisles of Christian basilicas had struck him, and he evidently thought he could not have too many aisles, nor could they be too long. He made in his mosque eleven aisles, more than 200 ft. deep, and his successors increased the number to nineteen and the depth to 350 ft.; but take the 200 ft., there was an effect produced that is unrivalled, an effect like that of a pine-tree forest, at once suggesting an infinity of number and boundless space; for the limits are shrouded in mist and gloom.

Doubtless Abd-al-Rahman I. had seen Acba's mosque at Kairouan, but we must be all the more thankful to him for appreciating what was fine, and seeking to perpetuate it. Two hundred years later on, we have the arches of Maksurah and the Villa Viciosa cusped on the intrados and extrados, which in some form or other persisted in Spain and Barbary till the end of the Moslem sway. Similar features are found at San Cristo de la Luz, and Sta. Maria della Blanca, at Toledo, yet we know not where these cusped arches came from. They may have been a pure invention of the Saracens.

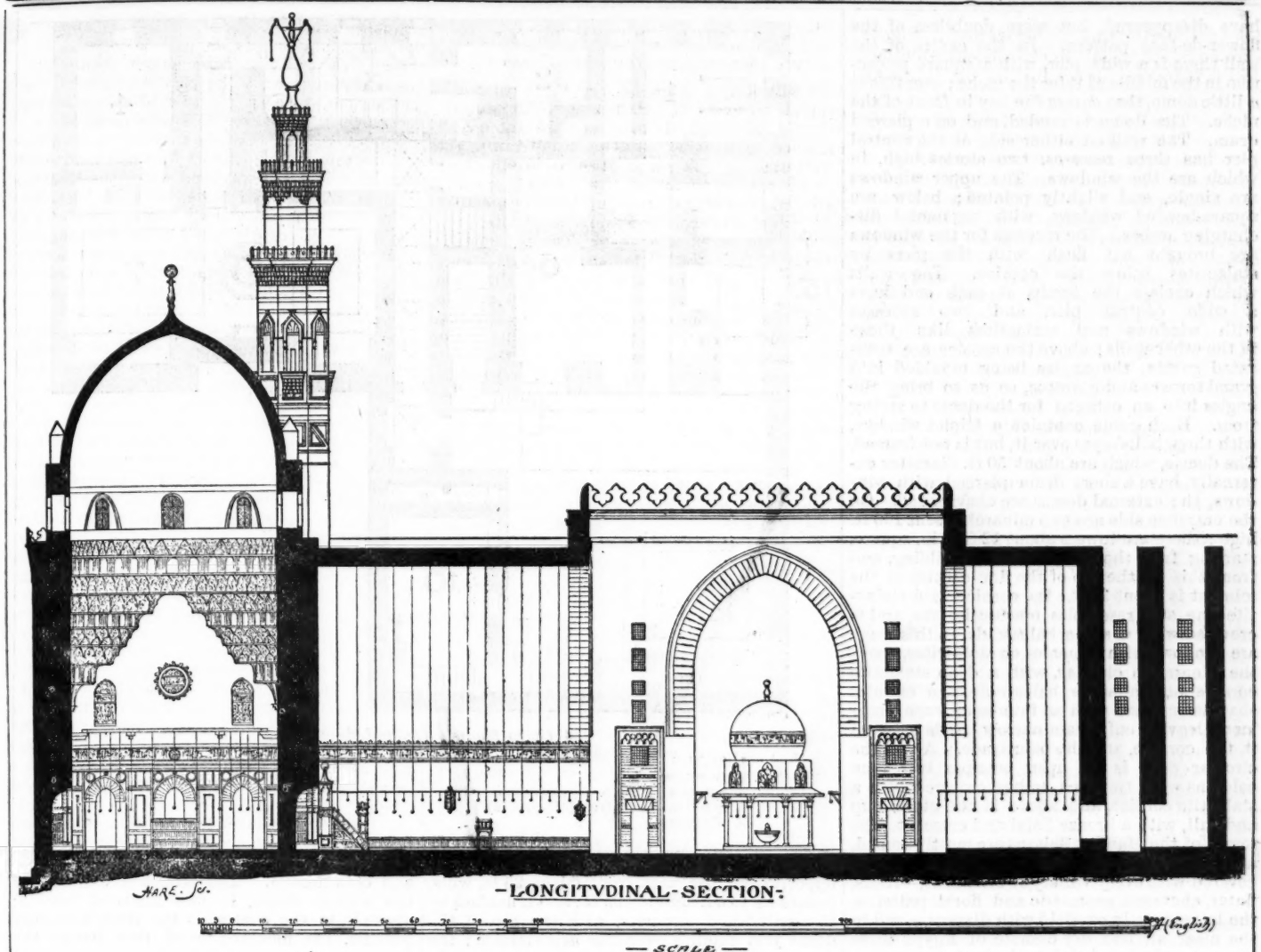
We next come to those two curious monuments near Baghdad, the tombs of Ezekiel and Zobeida. Zobeida was alive in 833 A.D., and at Mamun's wedding; therefore, if it was her tomb it was after that date. As to the domes, they are not confined to Saracen architecture, though they are one of its most characteristic features, for they abounded in Persian and Byzantine times, not to speak of Rome itself.

If M. Choisy is wrong, and the Persian domes were not of the days of Achæmenides, where did Agrippa's architect get his idea of the dome of the Pantheon from? for this was erected in 27 B.C., and the Sasanian dynasty did not begin till the third century A.D. Where the minarets came from I do not know, but they might have been suggested, and probably were, by Byzantine watch-towers, for if they were suggested by the isolated columns of Persepolis, they took an entirely different shape, except in Persia and very late in Cairo, but they are at once the most striking, original, and well-designed features of Saracen architecture. I am equally ignorant of when they were first used; the one at the mosque of Amru is, I should fancy, early, and so is the one at the mosque of Tūlūn.

The most striking ornament is the stalactite. The author of the theory I mentioned in my first lecture is of opinion that they had their origin in Persia. In the Cavetto of the crowning member of doorways in the days of Archæmenides there is an ornament consisting of three ranges of leaves, and each leaf has a semi-circular top. When seen in a drawing to a small scale, this ornament is not to be distinguished from the Saracen stalactites over door-heads; and a great part of Saracen stalactites in Persia are merely niches superposed. I believe the dome over the fountain in the mosque of Tūlūn contains the first example of stalactites, but all we know of its date is a remark in Mr. Poole's "Art of the Saracens in Egypt," where he says it was at least a century after Tūlūn's death in 883, or in 983, but, as a rule, those peculiarities that made the true Saracen style are not observed till about the twelfth century.

The main peculiarity to be noticed is the founding of all ornament on elaborate geo-

* Being the fifth Royal Academy Lecture on Architecture this session. Delivered on Monday evening, February 8.



Mosque of Sultan Hassan, Cairo.

metrical framework, and as often as not the geometrical framework was the only ornament. It is not flattering to one's national vanity to find that every book on Saracen architecture is a French one, except Murphy's and Owen Jones's on the Saracen work of Spain, and Mr. Poole's on "The Art of the Saracens in Egypt." Pascal Coste is our sheet-anchor, and Girault de Prangez and Prisse d'Avennes, the bowers. M. Jules Bourgoin has published a charming book called "Les Arts Arabes," to show the different patterns founded on geometrical figures that are to be found in Egypt and Syria. In the book there is an essay on the methods of design employed, which he calls "æsthetic geometry." He is, however, a man of few words, and so imbued with this æsthetic geometry that he treats it much as Sir Isaac Newton did Euclid, when, after reading the statement at the head of each proportion, he said it was ridiculous to attempt to prove what was self-evident. M. Bourgoin gives a few examples worked out with the most concise descriptions, which leave us like the Irishman, who was described as "a mark of interrogation standing prostrate." He also gives what he considers to be the key to each example.

As geometry is the foundation of architecture, the students may be safely advised not only to make themselves acquainted with the æsthetic geometry of the Saracens, but to work out every example he gives in the plates, seeing that it has been the foundation of a new style of ornament. I may add that any one who would publish a book giving the geometrical solution of all the patterns would do a good work and earn the gratitude of those who desire to fathom this subject; he might, too, be the founder of a new style of ornament; as it is not likely that the Saracens exhausted all the capacities of geometry.

I will now speak of some of the architecture which has merits of its own, unconnected with this very elaborate æsthetic geometry. You may see in the plans of the Persian mosques, though their date is late, that they bear a strong resemblance, as far as their court and transepts go, to the mosque of Sultan Hassan; and this is not surprising, as the idea is supposed to have been taken from some of the Persian palaces, but I do not think that this diminishes the credit we must award it. In the Pantheon at Rome we have without doubt the Roman rendering of some foreign colossal dome. The eye which lights it, and which is the main cause of its sublime effect, was due to an accident, that is, to its being built as the laconicum of Agrippa's baths, but to seize on a happy accident is one of the characteristics of genius. A witty architect* once said, "All the finest things in the world originated in accident, and such accidents happen to every one, but the man of genius alone knows how to make use of them." Every one has seen a hungry dog gnawing a bone and an old tailor trying to thread his needle, but Dante alone has made these into immortal similes.

The sublime effect of the mosque of Sultan Hasan is solely due to its plan, its proportion, and its method of lighting. After passing through a dark, narrow, and tortuous passage, one emerges into the brilliant sunshine of the central court, and sees in the middle of each of the four sides a vaulted nave or transept, the faces of which come sheer down to the pavement, without a screen. The pointed arches of three of them are nearly twice their width up to the soffit of the crown. Some small doors and tiers of windows doubtless help to give scale. The sanctuary of the mosque has the same sort of pointed arch, whose height is but a third more than its width, and this vaulted sanctuary has for its only ornament a deep band of Cufic writing. The sanctuary is nearly as deep as it is high, and standing at the niche end you look out of the gloom into the blinding sunlight of the court; so you see that vastness, simplicity of form, and lighting are the main causes of the sublime in architecture. The main features of the design are doubtless taken from the old Persian palaces; almost all of them had a vaulted vestibule, that at Feruz Abad has a very deep one, and there is one there in the centre of each end of the courtyard; at the same place there is a fire temple, whose plan is precisely similar to that of the mosque of Sultan Hasan. The arched recesses of the courtyard of the Persian mosques are the same feature, and the frontispieces suggested by the doorways of the Achæmenid palaces give them greater dignity. It is only to be deplored that the hideous, four-centred arch has taken the place of some more dignified form.

The grand frontispieces were doubtless suggested by the vast doorways at Persepolis, and these were evidently taken from Egyptian doorways. The Persian minarets were, I think, imitations of the isolated columns of the palaces at Persepolis and elsewhere, and though the splendid enamelled pottery, with which Saracen buildings of Persia are covered, took its rise from that of Babylonia and Assyria, it became Persian, and was not only much affected by the Saracens of Egypt, but was used by the Ottomans at Brusa and Constantinople.

The mosque of Edh-Dhahir Beybars outside the walls of Cairo, built about 1268 A.D., looks like a fortress; its front is about 354 ft. long, the walls are nearly 50 ft. high, crowned with bearded battlements; this sort of battlement, by the bye, was taken from the Persians; this front of Edh-Dhahir has a central projecting gate-tower, and two flat towers at the ends, the gateway having a pointed arch supported on columns, and its front is ornamented with two tiers of niches and some panels; the gate-tower is slightly higher than the walls, has bearded battlements, and a square tower over it, with square battlements; below the cornice of the wall are eight slightly-pointed windows on each side of the gate-tower, about 18 ft. from the ground to the sills; at the back of the gate-tower, at the other end of the mosque, is the dome over the bay in front of the niche.

The mosque of Sultan Barkuk, built about 1384 A.D., has his and his family's tomb at each end of the sanctuary. As far as its external features are concerned, it is a good type of a Cairene mosque, as many of the features persisted to the last, but, like that of Beybars I., it is not striped outside. The niche wall is about 236 ft. long, and 53 ft. high. The battlements

* The late W. W. Deane.

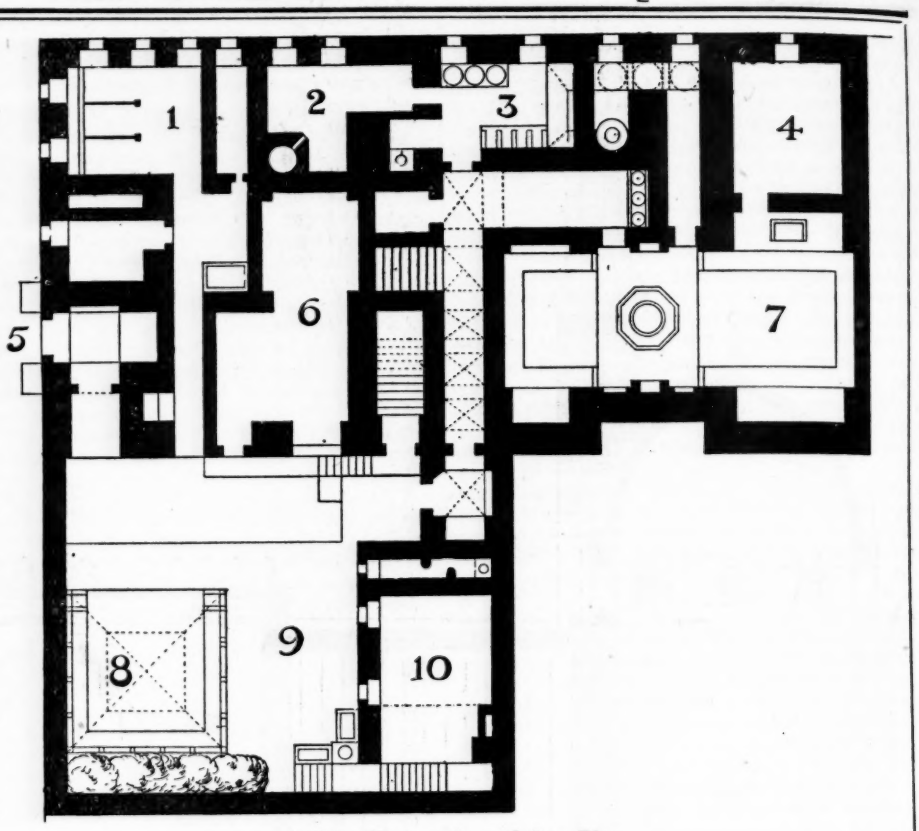
have disappeared, but were doubtless of the flower-de-luce pattern. In the centre of the wall there is a wide pier, with a square projection in the middle of it for the niche; over this is a little dome, that covers the bay in front of the niche. The dome is reeded, and on a pierced drum. The wall on either side of the central pier has three recesses, two stories high, in which are the windows. The upper windows are single, and slightly pointed; below are square-headed windows, with segmental discharging arches. The recesses for the windows are brought out flush with the piers by stalactites below the cornice. The walls which enclose the tombs at each end have a wide central pier, and two recesses with windows and stalactites like those in the other walls; above the cornice are truncated gables, the angles being moulded into grand toruses and cavettos, so as to bring the angles into an octagon for the dome to spring from. Each gable contains a triplet window, with three bulls'-eyes over it, but is not framed. The domes, which are about 50 ft. diameter externally, have a short drum pierced with windows, the external domes are chevronned. On the entrance side are two minarets about 150 ft. high; these are towers about 12 ft. 6 in. square, starting from the cornice of the building, and from this to the top of the first cornice of the minaret is about 34 ft.; its cornice is a stalactite one, and resembles machicolations, and is crowned with a stone balustrade, in this stage are windows with balconies on stalactites, above the minaret is circular, with a deep stalactite cornice and a stone balustrade, the circular shaft is enriched with an interlaced rope ornament, leaving only plain narrow bands between it, the cornice, and the balustrade. Above the circular part is an open octagon turret on columns with trefoiled arches, crowned with a stalactite cornice, and above is the stone cup and ball, with a bronze finial and crescent. The tombs of the Mamluk Sultans are mostly domed, and are very picturesque, the domes being covered with every variety of ornament,—reeds, flutes, chevrons, geometric and floral patterns, the latter mostly overlaid with diapers,—and in the clear air and dry climate of Egypt these are not only delightful to look at, but answer the purpose of keeping the domes dry; here the ornament would perish by the wet and frost, and would, too, be wholly clogged up with soot and dust.

The university mosque of El Azhar can only be described as far as its courtyard goes, which is about 160 ft. by 124 ft.; it was founded in 971 A.D., but has been so altered and restored up to the middle of the last century that little of the original building remains. The court is surrounded with an arcade of Persian arches on marble columns; over this is another storey ornamented with niches, and very small windows with bulls'-eyes beneath them; it has a geometric frieze and pierced bearded battlements; over its entrance is a graceful minaret, and at the end of the same front another; originally the wall seems to have been striped and subsequently plastered over.

I must not omit the charming little mosque of Kāït Bey, 1472 A.D. Its flank is not straight, but one end projects considerably, and its entrance is at the narrow return end. The walls are striped and mainly ornamented with windows in recesses, their tops brought out flush with stalactites, and the whole building is crowned with flower-de-luce battlements; on the flank by the entrance-angle, the first-floor has a triple arcade to an open belvedere, and this has a double arcade on the entrance front; but this is over the fountain which externally forms part of the mosque. Beyond is the high recess for the doorway, Persian fashion, that looks as if it had been built separately, as the courses do not match. Just beyond the door recess, the minaret springs from behind the battlements. Over the projecting flank is the dome covered with a geometric star ornament, filled in with foliage (a beautiful water-colour drawing of it by Mr. Spiers is on the table); except for its minaret and dome, you would never take it for a mosque, but all the ornamented parts have a quaint kind of elegance.

The mosque of Sidi Amar Abada, at Kairouan, shown in Mr. Alexander Graham's book on Tunisia, forms a picturesque group, with its five domes, three of which are on stepped square bases.

The Persian mosques must have been very striking; at that of Shah Abbas you come into a court 170 ft. deep and 223 ft. wide, with low sides, not more than 42 ft. high, in the centre,



A Cairo House: Ground-floor Plan.

1. Stable.
2. Bakehouse.
3. Kitchen.
4. Small mandara (reception-room).
5. Entrance.
6. Strangers' room.
7. Chief mandara.
8. Mak'ad.
9. Court.
10. Servants' room.

opposite you, the vast frontispiece, 95 ft. wide, towers up to a height of 105 ft., and is flanked by the cylindrical minarets, with the top of the dome just peering over the frontispiece; the deep shadow of the recess, when the sun is high, must greatly add to its impressiveness, and when we picture to ourselves that the whole courtyard is faced with enamelled bricks in gorgeous colours, it must surpass anything we have seen in magnificence.

I am painfully aware of the dulness of descriptions, but to fully illustrate all I have to say would take years to do; I will not, however, trespass on your patience much longer. I did mention the trefoiled-headed recesses that are often used to mark doorways. Their effect is both striking and unusual to our eyes, and I think with a little study, might be introduced here, and would greatly relieve the dull monotony of fronts. There are a few small architectural exhibits in Egypt that are marked by extreme care, delicacy, and originality of proportion, that are well worth profound study. Our best architects are very careful and painstaking about some of their smaller works, and often introduce delicious little bits. The study of these Saracenic motives would, I think, greatly aid them. The Saracen architects were not nearly so much fettered by rules of proportion as we are, and rightly thought that the object was to please the tasteful; I think that the late Professor de Morgan's dictum, which he applied to mathematics, is quite as applicable to architecture, "that rules are excellent things for those who can do without them." There is a doorway at Cairo in M. Bourgoin's book that illustrates in its details what I have been saying, and I may remark that the Saracen notion of marking the entrance by a grand feature was a happy one. A narrow band, consisting of two beads and fillets with a space between them, forming a guilloche at intervals, is used as a dado, leaving wide jambs to the doorway; it then rises up so as to form an oblong enclosure, high enough to frame in a small mezzanine window; the door jambs are quite plain, but the course at the top of the door is made into two delicate corbels, one on each side; above this is a deep enriched lintel, nearly as deep as the jambs are wide; the frame runs out on either side below the lintel, till it is in a line with the jambs of the door; and from this the frame runs up again on both sides, and across over the lintel, and again over the discharging arch, thus making two panels of unequal heights. The parts below the segment of the discharging arch is recessed and ornamented. The arch has voussoirs of the wildest shape, in two kinds of marble; above it, in the centre, is the little half-story window, the moulded band, that frames the doorway, going round it, leaving a square panel on either side. A little above the framing of the door is a square panel, not so wide as the frame of the doorway, with a large circular panel in it, which, with the spandrels, are ornamented. The rectilinear patterns are of the most recondite Saracen geometry, and are intermingled with floral patterns; but an equivalent in colour or texture would answer the same purpose, at any rate, if the shape of the voussoirs were kept. There is also a little wooden shop-front at Tantah that is replete with exquisite grace. It consists of the square framework of a doorway, and two windows, grouped with the door; the height of the doorway is about two and two-thirds of its width, and the windows are about two and a-half times their width. Some woodwork is fitted into the doorway and windows to make the openings "rastremati," as the Italians say,—*i.e.*, narrower at the top; the heads are flat ellipses, and at the springings there are peculiar hooked corbels; round the frame of the door is a narrow piece of lattice. Two pieces of panelled woodwork go from the windows to the fronts of the adjoining houses; above, under the bressmumer, is a broad band of intricate panelling in the centre, with the ends filled with lattices. I should say that the bottoms of the windows are filled in with turned balusters. You may think the upper lattices, from their position, more quaint than beautiful; but the exquisiteness of the lower part is certainly due, and due only, to a certain originality and a most refined and cultivated taste.

I have mainly confined myself to mosques, except in the case of the Alhambra, not because there are no other Saracen buildings, but because I thought that these more completely show the peculiarities of the style, but there are khans (the Xenodochia of the Byzantines), colleges, fountains, palaces, baths, houses, &c. The khans are curious, but are hardly of much use to us in England; they are fortified places where merchants, with strings of camels, mules, and horses, can put them up, lock up their goods, and have a small living-room for themselves; the palaces are mostly those adapted to a burning climate, and to Oriental potentates; it is curious that some features are precisely the same as in the days of the Achæmenides,—*i.e.*, the structure consists of a roof, supported on

slender columns, open between, the enclosures being made by curtains or hangings.

The arrangements of a good house are always more or less interesting, and there are two or three requirements to be noted in Moslem houses. Well-to-do people mostly keep a horse, a mule, or a donkey to ride on; the donkey is not the dull, slow animal in a hot climate that it is here, but, if of a good breed, it goes like the "blinding lightning." Well-to-do people bake their own bread, and, from keeping their women separate, may enjoy the society of whom they please. The Viceroy of Egypt would probably admit to his saloon and table a beggar who was a Hadji, he certainly would if he were an agreeable person as well; a Hadji being one who has performed the pilgrimage to Mecca, run seven times round the Kaaba, and kissed the black stone, and run up to the top of Mount Arafat, and had his head shaved. When I was in Cairo I visited a house, then deserted, that was said to have belonged to the Sheykh-el-Islâm, the chief mufti, or doctor of the law, a title that was first conferred by Mohammed II., when he took Constantinople. There is generally a stone seat for the porter outside the door, called a mastaba, the entrance-passage makes a sharp turn, so that no one can see inside, and the entrance is generally into the court, in which is an open pavilion, raised above the ground, a sort of summer-house or belvedere; there is often another on the first-floor of the house. The floor of the grand reception-room is on two levels, mostly paved with marble, with mosaic borders; in the middle is a plashing fountain, rising from the middle of a basin, mostly octagonal, often with little ones at the angles, with jets falling into the middle basin, like the font in the Baptistery at Florence. Over it, above the roof, is a latticed dome, and just beyond the fountain is the step up to the carpeted dais; you leave your shoes on the lower level. On either side of this dais, and sometimes at the end, are slightly raised seats covered with cushions that form the divans. The walls are lined with marble, sometimes inlaid, sometimes bordered with mosaic, and sometimes they are covered with enamelled tiles, and this is finished by a wood shelf, on which the fine crockery is put, so that if any of the pieces fall, they may fall on the cushions. There are, too, cupboards for keeping the cushions, &c.; these are closed by doors, but some have fantastically-pierced openings for bottles and vases. In the lower part of the saloon are often stepped fountains in the middle of each side, down which water trickles. Above the shelf there were, in this house, hunting-scenes on the walls; on one side of the daïs there is often a projecting lattice, or bow-window, in which the porous water-bottles stand, commonly called meshrebiyas, or drinking places; the saloon is mostly very lofty, and, whenever there is a recess or a break, the woodwork comes down in long stalactites; the ceiling is mostly flat, and the beams round and not far apart, the ends of the beams are brought into the square next the walls by stalactites; between the bearers the ceiling is panelled, and the whole covered with elaborate patterns, coloured and gilt; if one side looks into the garden, the lower window is often a plain lead light with circular panes of clear glass; above are the windows of pierced plaster, filled with stained glass that look like jewels. We know these saloons well from the pictures of the late John Lewis and Mr. Dillon. All architecture and decoration is, as a rule, confined to the inside; the house is mostly of stone to the top of the ground story, above of lath and plaster on a bressummer, carried on heavy stone corbels, often peculiarly moulded, looking as if folding-wedges had been driven in between the mouldings, and this part has windows filled with flat lattices, generally with one latticed bay-window; the eaves of this are decorated with pierced woodwork like our railway stations, often in two or three ranges, the bottoms coming below one another; the eaves generally project considerably for shade, and are carried on slight framed gallows pieces, with the double or triple rows of delicate pierced lear-boards. These, of course, cast long, sharp, fantastic shadows. Some of these pierced lear-boards to the schools over the fountains are peculiarly graceful and effective. Here and there, however, there are houses whose fronts have architectural pretensions, but I think mostly to the gardens or courtyards. Sometimes the architectural effect is confined to the ground story, and frequently to one feature. Sometimes a tall recess with an architrave runs up above the bressummer, and has a lintel of its own, carried by short puncheons on the corbels. The door is in this recess, with a half-story window over it, and with ornamental panels at the sides; the top is enriched with stalactites, and on either side of the architrave and beyond it there are sometimes panels of flat ornament; but when there is a mak'ad or belvedere on the first-floor the whole front may be architecturally disposed. A low door mostly forms the entrance to the ground-floor magazine, which has as well plain segmental or square-headed windows, with iron gratings. Above the belvedere is open, the upper part being supported by arches standing on a central column, with enriched sprandrels, and projecting eaves on corbels. The house door is reached by a flight of outside steps, and is enclosed in a recess running above the arches of the belvedere, with a trefoiled head filled with stalactites like those to some of the mosques; the recess has often two tiers of windows. Above the door and in the spaces between the door and window and between the two windows are filled with ornamental panels.

In one of the streets in Cairo, called Khot-el-Mokharbelyn, is a little oratory, called the Oratory of Abd-el-Rahman, who was lieutenant of the Janissaries from 1743 to 1754 A.D. The ground-floor is now used for shops, but from there being a semicircular niche in the back wall, it is most probable that it was originally an oratory; the present oratory is on the first-floor; the entrance doorway has a slightly pointed arch on columns; the lower fascia of the archivolt is godrooned, the upper fascia is ornamented, and is carried up square as well, and connected at the top by a guilloche, so as to frame the doorway; above is an ornamental pierced stone balcony, carried on stalactites, in front of an opening used by the cryer to call the hour of prayer; the rest of the front is separated from this by a frame. The ground-floor has three square-headed windows; over them is a triple arcade, carried on columns with peculiarly cusped arches; the arcade contains three square-headed windows filled with iron gratings; above the framework of this is a deep oblong frame, rather within the one below, and is formed into three square panels over the centres of the arches, with blank spaces between; in each is a bull's-eye, with a frame round the circle, connected on the four centres with the outer frame, and with ornamental spandrels; there is no cornice above this, but the whole wall is finished with flower-de-luce battlements, bulbed below the flower. It was, as you have heard, designed for ecclesiastical purposes, and has only been turned, by decay of piety, into domestic use.

ROYAL INSTITUTE OF BRITISH ARCHITECTS:

STAINED AND PAINTED GLASS.

THE eighth ordinary general meeting of this Institute for the present session was held on Monday evening last, the President, Mr. J. Macvicar Anderson, in the chair.

The minutes of the previous meeting having been confirmed,

The Chairman announced that letters had been received from the Home Secretary and Sir Francis Knollys on behalf of Her Majesty and the Prince and Princess of Wales in reply to the votes of condolence which had been sent by the Institute on the occasion of the lamented death of the Duke of Clarence.

The Honorary Secretary, Mr. Aston Webb, then read a long list of candidates recommended for admission as members of the Institute,—22 as Fellows, and 24 as Associates.

Two or three members attending for the first time since their election were formally introduced to the President; among them was the Bishop of Ely, Lord Alwyne Compton, of whom the President said that he was competent to form and express correct opinions on subjects of art and architecture.

Painted Glass.

The Chairman said that as they had four papers to be read, he would not detain them with any preliminary remarks, but would at once call upon Mr. Herbert Carpenter to read the first paper, of which the following is an abstract:—

Although the architect should be responsible for the whole internal effect of his design, it was not, in the author's opinion, necessary to determine exactly how far the stained-glass decoration should be under his control. He should, however, be able, without vexatious interference, so to direct those working with him that the painted glass should in style and treatment harmonise with the architectural design of the building and with its decorative treatment. As an example of the satisfactory result of the co-operation of the architect and the artist in glass-painting, he referred to the case of Truro Cathedral, in which Mr. Pearson and Mr. Clayton had together produced a very beautiful and harmonious interior. Through successive centuries the relationship between architecture and glass-painting had been very intimate. In early Christian times the intense eastern sunlight, streaming through small window-openings filled with gem-like glass, afforded a striking and brilliant contrast to the large wall-spaces. As architecture travelled westwards and northwards into less sunny regions, in the eleventh and twelfth centuries, windows necessarily became larger but the "mosaic" glass, with its Byzantine ornamentation, was still used, the gorgeous and jewel-like effect of colour being emphasised and intensified by lines and points of white glass, and the bold, black geometrical forms of the frame-work. In the thirteenth century not only the gem-like glass, but silvery and brilliant pattern-glass, of white with a bluish tinge in it, was used, together with rich bands of pictorial figure-subjects, on a white ground. In the fourteenth century the mosaic glass, as such, went out of use in the great mullioned windows, but its rich colours were retained, in combination with a lemon-yellow strain. The window tracery of this period was designed to frame the translucent pictures, though as time went on, and the masonry became more studied in design, the glass had to adapt itself to the masonry, rather than the masonry to the glass. As large windows multiplied, a large proportion of white or greenish-white or quarry-glass was employed. By very gradual changes the most characteristic English glass, that of the fifteenth and the early part of the sixteenth centuries, grew up, acquiring greater breadth than the gorgeously-tinted earlier glass, and infinite delicacy of drawing and tone, and combining with it especially painting on white glass with enamel colours and stains. At this time one mind and one idea inspired the designers both of the buildings and of their glass. After animadverting on Professor Moore's statement that nowhere, save in France, was there in glass-painting an actual spirit of original invention, the author spoke of the crude and incongruous designs or imitations of Mediæval work in memorial windows erected in the last half century, as compared with those described to have existed in Long Melford Church or in the Grey Friars Church, London. It appeared to him that the principle of the memorial window was of inestimable value, not only artistically and historically, but as a link of the present with the past. Symbolism in stained glass he considered should be neither too patent nor yet too recondite. With reference to modern painted glass he laid down the following postulates:—1. That the glass be brilliant, translucent, and jewel-like. 2. That the colours be, to a great extent, of pot-metal, of unequal tone and thickness. 3. That in each building its due proportion of white glass be fixed and adhered to throughout. 4. That the ironwork designed by the architect should be carefully considered in designing the glass, and that no sound ancient ironwork should be removed. 5. That the leading be an essential part of the design, to be shown on the glass-painter's sketch drawings. 6. That each window should form part of a complete scheme previously determined by the architect with the authorities of the church. 7. That the representation of sacred subjects should not be pictorial, nor realistic, nor sentimental, but should be treated in an architecturesque and conventional manner. 8. That a carefully-thought-out system of symbolism should be adopted. 9. That pictorial subjects extending over more than one light should only be selected when they lent themselves to arrangement in divisions. 10. That the series of figures or subjects be selected in proper doctrinal and historical gradation from west to east of the church. 11. That in memorial windows the kneeling figure should be introduced in the "predella" with a legible inscription. 12. That heraldry should be an essential part of the design, especially in memorial windows. 13. That in ancient churches, with windows of varying date, the glass should be assimilated in each case to the designs of the masonry. In conclusion, he urged that, as in architecture, so in the art of painted glass,

history and archæology should not be disregarded, and that there should be no spasmodic attempts at originality.

Some Details and Technicalities of the Glass-Painter's Art.

This was the subject of the second paper read by Mr. James Powell. The following is an abstract:—

In making a painted window, the first process is to prepare a small coloured sketch of the design, usually to a scale of one inch to a foot. On this drawing should be shown the ironwork, which should be so arranged as to assist and not interfere with the design of the glass.

The sketch having been approved, full-sized cartoons are prepared. For these, studies from the life are required, the hands and feet especially needing careful study. White subjects surrounded by colour should be drawn smaller that when against a white background. On these cartoons the ironwork and lead lines should be definitely shown, and upon the latter great pains should be bestowed, the lead lines being more conspicuous than the folds of the drapery. From the finished cartoon a tracing, called the "cutline," is made on calico of all the lead lines, and from this the cutter cuts the glass in corresponding lines. Great discrimination is required in the choice of the glass, so that its varying thicknesses shall coincide with the light and shade of the figures. When the glass is cut, it is taken to the painting-room, and all the leading lines of the cartoon, and also the ornamental patterns of draperies or diapers of backgrounds are shown with enamel pigment. The glass, after having been fired in the kiln, is then fixed with wax to a framed piece of plate-glass, so that it can be placed against the light on an easel. The paint (water-colour process) is then applied to the glass with a large flat brush, and worked flat or rough, according to the requirements of the design. The high lights are then removed with scrubs, or short hog hair brushes, and in the half-tones the pigment is reduced in density, and the shadows deepened by laying on another mat of colour. The glass is then again fired, and the above process repeated until the required strength is obtained, great care being taken to keep the shadows luminous. When the paint is finished, the silver stain is added, where required, to such parts as hair, embroidery of draperies, or foliage. The glass is next laid on its "cutline" on the glazier's bench, and the leading is put in. Mr. Powell himself prefers flat lead, as being stronger than the round, and better for the cementing. The lead should be from ¼ in. to ⅜ in. in width. After the window is soldered on both sides the leads are raised, and a cement of oil, lead, &c., is rubbed well in on both sides. The copper ties are then soldered on, and after a few days the cement has hardened and all is ready for fixing. As to materials used. Coloured glass is obtained by melting certain metallic oxides with the raw material or base. A good workman can so handle the melted glass as to produce variations of thickness, from which of course result varied tints of the same colour in one sheet. In some recent experiments the traditional charcoal yellow had been hit upon, and it had been found to be almost identical with the straw-yellow of the thirteenth century. Glasses made as above described are known as pot-metal colours. Flashed or cased glass, is used chiefly for ruby glass, the colouring matter of which is so dense that it is blown on a base of white glass; beautiful shades are also procured by casing the ruby with a blue or yellow glass. One great advantage of the cased glass is that you can with hyddric fluoride remove parts of the coloured film and expose the base colour underneath. This is especially useful in heraldic designs or the patterning of robes. The enamel used by the glass-painter for shading and outlines is a fusible glass containing a sufficient quantity of an infusible powder to produce the effect of opacity. The window may be painted entirely in water-colour, or it may be traced in oil-colour and matted in water-colour. The lead is first cast in short lengths, and then elongated by mechanical pressure. The leads used in old windows were usually very narrow, and were cast in their full length. A great deal of the old work had been re leaded with wider lead than that originally used. The leading of the thirteenth and fourteenth centuries was mostly designed in diagonal lines, and this diamond form gave a perfect drain for the water. For a window designed in a strong key of colour as much lead as possible should be used; in the whiter windows less lead is required. To the ironwork the artist should pay special attention. Saddle-bars should not be more than 12 in. apart. The most useful arrangement for modern work, except in very narrow windows, is to have a double stanchion, with saddle-bars at distances varying from 10 in. to 12 in., according to the width of the light. If the architect wishes for outside iron as well the glass-painter need not grumble, for it enhances his work. Wire-guards are an abomination to the glass-painter and a detriment to the architect, and sheets of plate-glass outside look worse still. A lead across a broken pane is preferable to a wire-guard. The glass-painter should remember that a window is made to admit light, and white glass should predominate, though an east window requires more colour than a side window. On these points the architect should advise. Too many different colours should not be used in one window. The best decorative effects are produced with a simple scheme of colour. There should be harmony between the glass and its frame. This harmony is never wanting in the old work of the best periods, and hence it may be supposed that the architect must have had considerable supervision of the glass. The design of the glass should be in relation to that of the stone. Windows should not be crowded with too many figures. A better decorative effect might be produced by using more ornament and fewer figures. The scale of the figures used requires careful study, and as to this the architect should assist. Arms and legs should not be thrown behind mullion; large compositions of figures and canopies running across several lights should also be avoided. Lastly, a scheme should be carefully prepared for the subject of the window; and the glass-painter should work in harmony with the architect.

The Painted Windows at Fairford, Winchester, and King's College, Cambridge, as Models for Modern Work.

The third paper, by Mr. N. H. J. Westlake, F.S.A., was on the windows mentioned above.

After suggesting a few of the many questions which arise from a study of the ancient examples of painted glass, the author pointed out that the considerations in studying old work were, (1) The appropriateness of glass to the church so far as light is concerned. (2) The scale of the details in proportion to the building. (3) The composition and colour value. He intentionally omitted the theological *schema* and iconography, because those ought to be settled beforehand by the theological and art authorities with the architect. The first consideration, he said, involved the questions of the size of the building, the size of the windows, the position and locality of the church, the amount of carving, painting, and other decorations, and the comfort of the congregation. At Fairford and at King's College, although the edifices were completely filled with painted glass, there was plenty of light. At Winchester the treatment was very similar to that at Fairford. At Fairford the openings were moderately large and plentiful, the glass fairly but not densely covered, and there was a great area of white in the canopies and draperies. At King's College the openings were larger and more numerous, there was less white, and the paintings were more dense. Chartres, he said, was an instance of a dark church,—the darkness not resulting from the amount of shadowing pigment on the glass, but from the smallness of the details, which involved so much lead and iron that a great area was rendered opaque. The architect could not dictate how much colour should be used until he knew whether all the windows were to be done. The proper character and quality of the painting on the glass, the quantity of pigment to be used, the amount of obscurity in painting on white and on colour, had been but slowly learnt by the artists in different countries. The earliest work was similar wherever found, but in the early years of the sixteenth century the northern countries used less pigment than the southern. English work of the best periods was as delicate and translucent as any: compare Fairford, King's College, and Winchester with the German and Flemish glass of St. Mary's, Shrewsbury, and Lichfield Cathedral. Between French and English work there was no great difference of tone. In the nave aisles of Cologne the covering of the glass was moderate; at Milan the covering was increased; at Florence, Bologna, Arezzo, and SS. Giovanni è Paolo, Venice, the glass was all more or less heavily painted. The painting at Fairford was often unequal in tone, the inequality being in most instances intentional; *e.g.*, the east window had more pigment than the aisle windows; but the diversity in covering the glass at Fairford was not so apparent or so necessary as in a large edifice like Winchester Cathedral. The windows from Winchester College (now at South Kensington) were a good example of the amount and character of the painting used in a chapel with plenty of large openings. In King's College the difference between the chapel glass and that in the large windows afforded an excellent comparison by which to acquire a knowledge of the painting of the glass under different conditions. Many of these windows, however, had been badly over-painted in restoration.

The Renaissance Period and the Use of Enamel.

The fourth and last paper was by Mr. Clement Heaton, who treated of the above-named subject. He said glass-painting originated from enamelled metal work, and in its early form was an assemblage of small pieces of glass, heavy in texture and strong in colour. As years went on it became lighter and lighter in general tone, the glass itself becoming thinner in substance and the colour less intense, while in all ways there was a progression towards lightness. A style of work was arrived at late in the fifteenth century containing principles which could not be departed from without loss of effect, and which he considered was in England more successful than in France. Admirable as this work was, it was not the highest development of glass painting. There was a limitation of design and conception, power of colour and drawing, compared with both earlier and later work. The earliest glass was geometrical in character, and the later Gothic purely architectural. The canopy work based on architectural models was monotonous through its endless repetition. In the sixteenth century, when new ideas came into France from Flanders and Italy, glass painting was thriving as regards technique, and the "Renaissance" was really in design alone; *motifs* of ornament from Flemish and Italian Renaissance were adapted and expressed in Gothic *technique*. In Rouen examples remained showing the transition; and the earliest of them exhibited this use of Renaissance detail, treated technically in the same manner as the Gothic canopies. In King's College Chapel, Cambridge, was a similar series of English examples, in which, however, the Italian influence appeared less direct. This was not surprising, as Leonardo da Vinci, Andrea del Sarto, Benvenuto Cellini, Rosso, and Primatice, and many other less-known Italian craftsmen, worked in France for a time. The art of glass painting was the more influenced because the line of separation between architect, sculptor, painter, and glass-painter was little marked. Jean Cousin was at once architect, sculptor, a prominent painter, glass-painter, and engraver, while he possessed enough knowledge of anatomy and geometry to write treatises thereon. It was to the breadth of study then in vogue that Mr. Heaton attributed the power of the work done from 1520 to 1550. The works of the Middle Renaissance showed a wondrous combination; the true principles of glass painting,—glorious colour, refinement, grace and power of drawing, vigour of design, and individuality of conception,—all might be found united in the same work, and that work such as only artists who knew all the *technique* of glass painting could produce. After 1550 the glass painter aimed less at producing a beautiful glass painting than a picture full of strong contrasts in light and shade; the *technique* was interfered with to obtain such contrasts, and so the grace and the silveriness of the glass was lost and the colouration sacrificed. There were therefore three distinct phases of work to consider:—(1) Where sound principles and traditions were worked upon, but with limited artistic power; (2) where these same principles were used combined with great artistic power; and (3) where this power was misdirected and crippled by the abandonment of the true principles. Study of the second phase,—the most notable,—showed that certain principles must be adhered to, and that mere use of them, without individuality of conception and personal care, would only lead to monotony. The personal care of the artist must not stop at the design, but must be carried through every step of the work. The breadth of study among the artists of the Renaissance was well worthy of attention. M. Lucien Magne, who had closely

studied sixteenth-century glass, had written: "The first cause of the inferiority of modern work as compared with the old appears to me to be in the isolated instruction of the arts." Mr. Heaton then proceeded to mention the introductions in *technique* of the Renaissance. The pot-metal colours had been much extended in range, which was due to the system of plating; the silver stain was made to produce not only yellows, but orange and red; the brown painting colour was supplemented by a red; and finally transparent enamels were introduced about 1540. This last he made special mention of as being so influential and so specially a Renaissance feature. In the MS. of Theophilus,—twelfth to thirteenth century,—instructions were given for "placing gems on glass," and a description was added of how small pieces of glass were to be cut out, put on the white glass, and melted on to it. Various examples of this process were known, but the method was unsatisfactory; the use of fluoric acid had done away with the necessity of grinding the glass, but the use of transparent enamels best got over the difficulty of which all glass painters had been sensible. It was probable that the application of transparent enamels arose through the use of enamel in goldsmith's work, as was indicated by a recipe in Mrs. Merrifield's translation of the Bolognese MS. of the fifteenth century. Whether the idea came direct from Italy, or the French themselves adapted the enamel to glass from the enamelled jewellery and pottery, it was difficult to say. At Rouen there were several examples of the use of enamel in conjunction with pot metal glass; and enamel colour alone was used in the sixteenth century for panels and medallions, specimens of which could be seen in Rouen Museum, and some of a later date at South Kensington. It was also used by Giovanni da Udini in Florence about 1560, and in England in the time of Elizabeth. Although so extensively used it had sometimes been urged that its use was illegitimate, which was probably in consequence of its misuse and of ignorance in working it. Properly worked it was very reliable, as was proved by the fact that enamels done in 1540 were sound at the present day. As to the artistic use of enamel, any attempt to use enamel colour in large quantities and in rivalry to pot metal glass the author condemned. It was, so used, an inferior result obtained in a roundabout way; but in conjunction with pot metal glass he considered it might be of great value if used with proper artistic discretion. For domestic use it could be a means of rendering colour in a fine way in harmony with modern interiors, which leaded colour was certainly not. It was an additional power, and as such required additional judgment in its use, while without artistic judgment and the restraint of good taste it would be more than likely to lead to very objectionable results.

The President, in inviting discussion, said they had with them so many distinguished artists who could speak with authority on the subject which was before them, that he proposed at once to call upon them to do so. He would ask their good friend and distinguished colleague, Mr. Alma Tadema, to move a vote of thanks to the authors of the papers.

Mr. Alma Tadema, R.A., said he felt honoured in being asked to move a vote of thanks to the readers of the papers. He had been very much interested in hearing so many artistic and technical views on a subject which had had so much influence on art and architecture. They would remember how Viollet-le-Duc was led to the pursuit of art by seeing the stained-glass windows of Notre Dame at Paris. He was quite convinced that the development of the art feeling of the people in France was greatly due to the people going in and out of the churches and seeing such wonderful windows, full of rich colour, and illustrating subjects which could not fail to influence them. It was therefore quite natural that the majority of the papers were devoted to the religious expression of stained glass. Perhaps the question of the use of stained-glass windows in domestic architecture had not been touched upon so much, though in modern times the architect must often have been asked for such windows. In towns, for instance, where one had a window opposite an ugly blank wall, it was a great advantage to have a stained-glass window. Of course, figures of saints and other things strictly belonging to religious art were a little out of place, and, therefore, a purely decorative scheme of treating the glass would be preferable. Mr. Lafarge, in America, had applied himself to work of that kind with a very great deal of success, and he (the speaker) was the happy possessor of one of the finest specimens of his work. As they knew, he admired the old Romans very much, and he rather believed that they had stained glass, though not in our sense of the term. He knew that there was in Pompeii, in a little house, a piece of sheet-glass of a beautiful purple colour, built in the wall. In conclusion, he said he was quite sure he expressed the views of the meeting in proposing a hearty vote of thanks to the authors of the four most interesting papers which had been read that evening, and to whom they could not be grateful enough.

The Chairman said he hoped that the Bishop of Ely, out of the profundity of his knowledge, would be kind enough to second the vote of thanks.

The Bishop of Ely said he should have pleasure in seconding the vote of thanks to the authors of the papers, but he feared that it would be out of the shallowness of his knowledge, rather than out of its profundity. He had been exceedingly interested in hearing the four papers read; they were most instructive, and contained many most valuable hints. He was delighted to hear Mr. Powell denounce the practice of putting wires outside painted windows. That was a thing he had been fighting against for many years. An occasional crack would be far better than having the effect of the window always spoilt by the wires. There would be some reason in putting up the wires to protect an ancient window, but why should they put such wires in front of modern windows? He had seen many modern windows which he should be very glad to see broken. There was one point which was very often forgotten: that it was necessary that they should have light on certain parts of the interior of a building. Very often in the east end of a church painted glass was put in, and gradually worked in towards the west. The result, as a rule, was that the east end was perfectly dark, while the nave was so light that when standing in it the chancel appeared to be a dark hole. He thought that was a great mistake. He thought it was possible to use a good deal of white glass in the eastern end of the building. He was not very fond himself of glass which was all white. He quite agreed with what Mr. Carpenter and Mr. Powell said, for he thought that the one effect proper to painted glass was colour, and the very white-toned windows were unsatisfactory in that respect. Of course, he did not mean to depreciate good form and beauty of drawing, but he thought they might have that in combination with colour. As to the Romans making use of coloured glass, there was a passage in one of the old authors directing one how to make blue glass, and the reader was directed to take and grind down "sapphires." He thought that the "sapphires" in question must have been Roman blue glass; for, of course, they would not grind down gem sapphires. He had very great pleasure in seconding most heartily the vote of thanks to the four gentlemen who had so kindly favoured them with such interesting papers.

The President said he should next call upon one of their professional brethren,—one whom they were very glad to see with them that evening,—and who, he hoped, would allow them that opportunity of publicly congratulating him upon the honour which had been recently most deservedly conferred upon him. Of course, he referred to Mr. T. G. Jackson, who had recently been elected an Associate of the Royal Academy.

Mr. T. G. Jackson, A.R.A., who was heartily received, said that in the first place he must thank them very sincerely for the kind way in which they had received his name in connexion with the reference which the President had made to his recent election to the Academy. He was glad to have the opportunity of accepting their invitation to hear such admirable papers as those which had been read that evening. Benefit was always to be derived from such meetings, and he thought that the more opportunities artists of all kinds had of meeting together and discussing their different crafts, the more they were likely to advance art. The art of glass painting seemed to possess an unusual share of the perils which had assailed the art of architecture, one of the greatest of which was the danger of lapsing from art into archæology. Glass painting was, of course, exclusively a Mediæval art, and could be best studied in the buildings of the Middle Ages; but in designing or considering the subject of stained glass, one of the difficulties that they had was, out of the mass of material, to select what was best suitable for their adoption and development. In England and France, having discovered, as they did very early, the means of making extremely rich and brilliant coloured glass, they seemed to have gone to the very extreme, and to have thought that they could not make the colours rich and heavy enough; but while one was impressed by the charm of such glass as that at Canterterbury and Chartres, it would be impossible for us in the present day to attempt anything of the kind. It used to be said that we could not get the glass of the right quality; but he thought they might dismiss that altogether, because the production of any kind of glass was now quite within the power of modern chemistry. But something besides the glass was wanted, viz., the habit of mind which enabled the artists of old times to produce such designs as they did. We in the present day could not work in the simple, naïve manner which to them was natural, for in us it would be mere affectation; and without following their manner it would be impossible to produce glass like theirs. The most useful stained glass for our study was, he thought, the later glass, in which one got more perfect designs and a higher form of art, although, perhaps, not in the same gorgeous and transient effects of colour as in the early glass. For our modern purposes, he thought, the lighter glass was most useful. Many interiors owed a great deal of their charm to the pure light, or even the dusky light, which came in through windows glazed with ordinary glass. Nothing that had been done of late in Westminster Abbey in the way of filling the clearstory with painted glass compensated to his mind for the loss of the old wonderful light which used to steal in by the clearstory windows through the dusky and somewhat murky atmosphere that filled the Abbey, producing the most exquisite effects. That was now lost, and what had been done was, in his opinion, loss rather than gain. In town churches there might, perhaps, be good reason for using stained glass more extensively, but in country churches stained glass must be very good indeed if it was to compensate for the loss of the blue sky and the green trees seen through the windows. He might, perhaps, mention one or two old examples where stained glass had been used in combination with ordinary glass with very happy effect. In both the great churches of Nuremberg, the Sebaldskirche and the Lorenzkirche, he thought there were windows which, in the lower part, were filled with richly-coloured stained glass, but which was not carried right up to the head, but finished some part of the way up with a sort of canopy,—he forgot exactly how, but, at all events, there was a definite finishing, showing that it was never intended to go any higher,—the remainder of the window being filled in with ordinary white glass; the effect was admirable. Another instance, with which he was more familiar, was in one of the chapels at Oxford. In Wadham College Chapel there were on each side of the choir five transomed windows. The lower part below the transomes was filled with painted glass and the upper part was filled with ordinary window glass, which was the original arrangement, and the effect seemed to him to be extremely pleasant. It dated from the year 1622. The chapel was perfectly light, and, at the same time, a very rich effect of colour was obtained by the amount of painted glass in the lower parts of the windows. Of course, if glass in such a position as that were painted very heavily, it would look dirty, but at Wadham College Chapel, to his mind, it was treated with great success.

Mr. Henry Holiday said he was glad to perceive the distinct advance which artistic opinion had made on the subject since it was before the Institute some years ago. It was now generally recognised that archæology was not art, although it might greatly aid them in its study. They ought all to be ready to learn from the study of the past, but the duty of artists was not to imitate the work of the past. No great artist had ever succeeded in doing anything good by imitating that which had been done before him. Art was growth, and each artist at any of the old periods when great work was produced had done what he did, not as an imitator, but as a producer. Of

course it did not follow that every development was an improvement, but he thought that any artist worthy of the name would rather make a few technical errors in his art than produce lifeless work, for mere imitation must always be absolutely lifeless. All good artistic work must express the ideas of the artist and the ideas of his time. Thirteenth-century work was modern; so were Giotto and Michelangelo, and so must be every great artist. One great question which came home to the artist in dealing with the decorative arts was: How far could realism be united with true architectonic principles? There was a certain confusion of ideas often to be met with in discussing that subject with outsiders, who often seemed to think that if a piece of decorative art was not archaic in character it must be an imitation of an oil-painting. They all knew that what was known as the "Munich school" had wholly failed, by attempting to make stained-glass windows imitations of oil-paintings. They failed in the way that the Gobelins tapestries failed,—in endeavouring to make one material imitate the effects of another material; they failed to get the effects of the other material, and they sacrificed all the beauty of the material with which they were dealing. The question, then, as he had said, arose, How far could an artist be realistic without failing in architectonic qualities? In his opinion, that was a question which would settle itself for each artist if he remembered that he had to consider his material, his situations, that he was working for a window and not painting on a wall, that he was working in transparent glass joined by leads and not with oil-paints. If he kept those things clearly in mind, then would he never fail by attempting to secure all the interest that could be obtained by imitating beautiful forms in outline and even beautiful forms in modelling. He would ask any one who had examined the frieze of the Parthenon whether he thought that the splendid decorative qualities of that frieze had been in the slightest degree sacrificed by its most beautiful imitation of the forms of horses and of human beings? In the thirteenth century, as well as at the present day, some of the greatest beauties of art had been obtained by what was to the artists of that day realism. If we compared the stained glass of that period with the miniature painting of that period we found precisely the same qualities in both. It was clear that they imitated to the best of their power. The fact that they could not imitate as accurately as we could detracted to some extent from the perfection of their forms; but, on the other hand, it left them a little freer to consider the mere technical qualities of the material, the jewelled beauty of the glass. But was there anything in the delicate play of tone about such figures as those of Mr. Burne-Jones, in the drawings exhibited, which would not add to rather than detract from the beauty of the glass for which they were prepared?

Mr. C. W. Whall said that an experimental practice which he himself adopted, and which he had not seen used elsewhere, was that of designing a window in glass itself. He made a sketch of the window in glass, cutting the pieces out on a small scale to an inch scale tracing.

Mr. Lewis F. Day said there was a suggestion that anything like originality must necessarily be spasmodic, and that if we were to do good work we ought to copy something old; but Mr. Holiday had practically answered that. With regard to the influence of style upon design in stained glass, he thought people in general, and perhaps architects in particular, were a little too much inclined to insist, for a church or whatever it might be, upon precisely the style in which the glass-workers of that particular period worked. Of course, every artist who designed stained glass, if he were an artist at all, did instinctively consider the style of his architecture, and he must do so; but that was quite a different thing from insisting that he should work in the style in which the glass-workers of that particular period worked. His own idea was that the artist in stained glass (as in anything else) should study the course of stained glass, and be perfect master of all that had been done in stained glass in every period. He should also study the styles of architecture. Being conversant with those two things, he should do the best he could with the glass, bearing in mind its surroundings. He did not think that necessarily meant that he was to do what was done by the glass-painters of that period. It was possible that the men in the thirteenth century did not know so much about stained glass as the men in the fifteenth, and so on. We found that men insisted upon having Renaissance work, for instance, after the manner of artists who knew very little about glass. In the Renaissance there were stained glass artists who did glass that was almost as "mosaic" as thirteenth-century work.

The President, in putting the motion for a vote of thanks to the authors of the papers, said they owed a debt of gratitude to the Art Standing Committee, and more particularly to their Vice-Chairman, Mr. Carpenter, and one of their Honorary Secretaries, Mr. Caröe, for the great trouble they had taken to arrange that meeting.

The vote was passed by acclamation, and Mr. R. Herbert Carpenter, on behalf of the readers of papers, briefly returned thanks, and the meeting terminated with the announcement that the next business meeting of the Institute would be held on March 7, followed by a special general meeting to elect the Royal Gold Medallist for 1892 and to consider the amended paper of "Suggestions for the Conduct of Architectural Competitions."

Illustrations.

ILLUSTRATIONS OF OLD CHESTER.*

II.—WATERGATE-STREET.

IN the sixteenth century, Watergate-street was of great commercial importance. Each side yet possesses immense bonded warehouses. When Chester was a thriving port, it was the principal street in the city, and contained several interesting mansions; in fact, it is the most picturesque and characteristic street in Old Chester. The Rows are especially interesting, although the purpose for which they were designed is doubtful. They form galleries or piazzas, one story above the street, to which they run parallel, and are approached by flights of steps at various places. At the Cross their elevation is about 10 ft. In front the Rows are generally open, and have a low railing. In the Rows are ranged the principal shops, and between these shops and the railings is the main thoroughfare of the citizens. Over all are dwellings, so the thoroughfare forms an agreeable promenade in all weathers. Underneath the Rows are other shops entered from the street. Various and contradictory are the theories of the origin of the Rows. The most rational contention appears to be that they were used as covered entrances to the residences of eminent Roman citizens, as, in the rear, remnants of extensive gardens are traceable. The Row, on the north side of Watergate-street, is a good example of the Rows as they existed in the last century; the south side possesses the greatest number of interesting buildings. Near the Cross is "God's Providence House" (restored). Two hundred years ago this was the residence of a family of distinction, evident from the armorial bearings carved on one of the beams. According to tradition this was the only house in the city which escaped the plague in the seventeenth century, and in gratitude for that deliverance the owner had carved on the front "God's Providence is mine Inheritance, 1652." Lower down on the same side,—under the Row,—is the old crypt, said to date from 1180, and adjoining this the remains of the town residence of Leach of Carden, a very fine example of old woodwork; the high hall and pendant still remain, and there is a noble fireplace of great height. At the back of this tenement is the "Lady's Bower."

Continuing downwards we reach "Bishop Lloyd's Palace," which is, without exception, the most remarkable house in Chester, and, perhaps, has no equal in Great Britain. The origin of this house is not known. Bishop Lloyd died here about 1650. The date carved in one of the front panels and certain armorial bearings have an analogy to the bearings of his family. The centre gable of the three, seen to the right of the illustration, exhibits a profusion of grotesque ornament carved in oak. Under the windows are eight panels. The first contains "Adam and Eve in Paradise," and "Cain slaying Abel," next "Abraham offering Isaac"; the seventh has a curious representation of the Immaculate Conception; the eighth symbolises the completion of the sacrifice in Simeon's prophecy, "Yea, a sword shall pierce thine own heart also." The centre panel contains the arms of James I., the supposed arms and quarterings of Bishop Lloyd, and a Latin inscription with the date 1615. The supports in the row are profusely carved with indescribable forms of men and beasts, the three windows to the left belong to the room in which is placed the fireplace, already illustrated, the panels in this gable, which are now quite plain, are supposed originally to have been decorated similar to the last. A little lower down is a passage or entry called "Puppet Show Entry," chiefly memorable as the scene of a terrible explosion, which took place on December 5, 1772. Opposite formerly stood a fine old mansion of wood and plaster, the city residence of the Mainwarings, a notable Chester family.

Continuing on the south side is the Yacht Inn, at the corner of Nicholas-street, of no architectural importance. At one time this was the first hotel in the city, and here Dean Swift lodged on one of his journeys into Ireland, and invited the dignitaries of the cathedral to a supper; but, to his great mortification, not one of them appeared. Disgusted, he scratched on one of the windows,—

> "Rotten without and mouldering within,
> The place and its clergy are both neor akin."

Lower down, and up a narrow and inconvenient passage is "Stanley Palace," formerly the residence of the Earls of Derby. This is an elaborately-carved three-gabled house, and is, perhaps, the oldest unmutilated specimen of a timbered house in Chester. The date of its erection, 1591, is carved in front. Near to this is the Water-gate and the Roodee. Returning on the opposite side is Stanley-place, the Old Linen Hall, and opposite the Yacht Inn is Trinity Church. Little, if any, of the original remains. In the entrance lies the defaced effigy of a knight in mail armour, Sir John Whitmore, of Thurstaston, in the reign of Edward III. The legend runs:

> "Hic jacet Joannis de Whitmore, qui obiit
> 3 kal. Octob. A.D. 1374."

In Trinity-street, adjoining, stands the dissenting chapel, erected by Mathew Henry and his friends in 1700. Continuing east we enter the North Row, in which is situated the new Liberal Club, formerly the County Court-buildings. Two doors higher, 24, Watergate-row, contains an effective hall and staircase, on a small scale, the subject of one of our illustrations; and in the next Row (near St. Peter's Church) the Deva Tavern, in which there is a handsome oak mantelpiece, and below, on the same premises, is a curious chamber, entered from the street.

T. P. IVISON.

* The first of this series of views was given in the *Builder* for February 6 last.

STANFORD HALL, NOTTINGHAMSHIRE.*

THIS is the north view of Stanford Hall, the seat of R. Ratcliff, Esq., to which considerable alterations and additions have recently been made.

The centre square block and the circular wing walls are the only portions of the old Hall. New offices entirely have been added on the east end, also fine oak stairs, conservatory, and reception rooms facing the south, and an addition to the drawing-room. On the west, the library has been enlarged, and new smoke-room, billiard-room, garden entrance, gun-room, lavatory, &c.

Messrs. Walker & Slater, of Derby, are the builders who carried out the works. The decorations and upholstery were executed by Messrs. Trollope & Sons. Mr. Westley H. Fletcher is the architect for the whole of the works.

* This is correct, and not Leicestershire, as stated on the plate, which the architect tells us was a mistake on the original drawing.

EXAMPLES OF SARACENIC ARCHITECTURE AND ORNAMENT.

THE two plates showing portions of Saracenic architectural detail, and of mosaic and wall ornament, formed a portion of the illustrations to Professor Aitchison's fifth Royal Academy lecture on Architecture, and are referred to in that lecture, which will be found in full on other pages.

LONDON COUNTY COUNCIL.—Under the title "Three Years' Work of the London County Council" the *Metropolitan* issues a small separate pamphlet giving a summary of the work of the Council from 1889 to 1892. It may be useful to electors at the present moment.

THE ARCHITECTURAL ASSOCIATION:

DOMESTIC ELECTRIC LIGHTING.

THE ordinary meeting of this Association was held on the 19th inst. in the Meeting-room of the Royal Institute of British Architects, 9, Conduit-street, the President, Mr. F. T. Baggallay, in the chair.

Mr. E. S. Gale, senior honorary secretary, read a letter which had been received from Sir Francis Knollys, on behalf of the Prince and Princess of Wales, thanking the members of the Association for their expression of sorrow at the recent death of the Duke of Clarence and Avondale.

Messrs. F. R. Betenson and E. F. Ware were then elected members of the Association.

Mr. Gale announced a donation to the Studio, by Mr. F. R. Farrow, of a set of plates on building construction. A vote of thanks was awarded to the donor.

Mr. Gale also announced that a member of the Association, who wished his name to remain unknown, had generously offered an annual prize of 5*l.* 5*s.* for measured drawings made under certain conditions.

The President proposed a vote of thanks to the anonymous donor, which was carried by acclamation.

Mr. Max Clarke then read a paper on "Domestic Electric Lighting." The following is an abstract of the paper:—

After some preliminary remarks, the lecturer said that the question naturally arose, "What had architects to do with electric lighting beyond seeing that there was light, and that it was properly disposed about the various apartments to be dealt with, and that the fittings or apparatus by which the light was brought to view were of what might be termed an "artistic" character? By some, the answer to that question would be, "Nothing whatever. When the building is sufficiently advanced, send for the electric light engineer; he will see to all that." And such was, no doubt, the course often adopted with regard to special branches of work. But while, perhaps, few architects went into the question of the size of the gas-pipes in which gas was laid on, or whether the pipes were run in the best way, it was desirable that they should know something about the capacity of electric-light wires, for although too high a pressure of gas in a gas-pipe would only have the effect of giving a bad and wasteful light, too strong a current of electricity in a wire might cause a building to be set on fire.

He took it for granted that everyone would admit that lighting by electricity was the light *par excellence* of the present age. No light was in any way to be compared to it, whether for public or domestic purposes,—for galleries where there were valuable pictures, for museums where there were art treasures, and for the fireside. For all, the incandescent electric light possessed every advantage, without any of the drawbacks of any of the other illuminants in use. He proposed to confine his remarks to incandescent lamps, and to saying nothing of the arc lamps used for lighting streets and railway termini.

The plant necessary for a domestic installation of electric lighting might be summed up as (1) the power,—water, steam, gas, or petroleum engines; (2) the generators, or dynamo-electric machines; (3) the accumulators, or storage batteries; (4) the wires or conductors; and (5) the lamps, which produce the light.

1. *The Power.*—A great deal of the cost of an installation hinged on the power. Sometimes water-power was to be had at a very low cost, while in factories and the like, as well as in many mansions and private houses, spare steam power was often available. In towns or anywhere where there was gas, the gas-engine was always available where steam could not be used, and for small installations the gas-engine was perhaps the best, as it was not very expensive in itself, required little attention, and could be put up in a small space. The great point to be borne in mind was to have the engine, of whatever sort or type it might be, well up to its work. An engine which was always worked much above its nominal power was more or less distressed, did not go so regularly, did not last so long, and needed more repairs than one well up to its work.

2. *The Generator*, or dynamo electric machine, briefly described, consisted, in its simplest form, of a large magnet or of a number of magnets between the poles of which a number of coils of wire, usually of copper, wound upon an iron core, were made to revolve. Each coil had its terminals connected to a separate strip of copper, these strips being arranged near one end round the shaft upon which the whole revolves, the coils and core so arranged being called the "armature," while the copper strips at the end were called the "commutator." Copper strips or brushes were held against the commutator, and as the current or electricity was generated in the coils of wire it was conveyed or driven into (Mr. Clarke said he hardly knew which) the commutator, collected by the brushes, and transmitted either to accumulators or direct to the lamps, the supposition being that the current flowed away through one brush and returned through the other. There were so many dynamos, all, no doubt, possessing merits of their own, that it was impossible to give within the limits of a short paper anything more than a general idea. As a rule, the magnets were made magnetic by being excited; in their normal state they were only bars of soft iron. The soft iron had a certain amount of what might be called latent electricity or magnetism in it, and when the armature was made to revolve a very slight current was produced; the current passed through the coils surrounding the soft iron bars, and the result was that the bars became electro-magnetic, gradually getting stronger, and when it could take up no more from the armature the full current was conducted along the cables for use. There were also machines producing what were called alternating currents, which at the present time were largely used. Professor Thomson's definition of a dynamo-electric machine was that it was "a machine for converting energy in the form of electric currects, or *vice versâ*, by the operation of setting conductors (usually in the form of coils of copper wire) to rotate in a magnetic field." For the purposes of the present paper, then, the dynamo-electric machine might be taken as a machine for the manufacture of electricity. As before mentioned, there were many varieties of such machines. Those "wound in series" were best adapted for arc lamps; those wound "compound self-regulating" were best for incandescent lamps driven direct; and "shunt-wound" were best for charging accumulators.

3. *The Accumulators, or Secondary Batteries.* The accumulators, which were to electric lighting what gasometers were to gas-lighting, had an important part to play. By their use a serious drawback,—the liability of instantaneous failure of the light by the breakdown of some part of the machinery,—was got over, and they also rendered the light absolutely steady, which was not the case, as a rule, when the lamps were fed with the current direct from the dynamo,—at any rate not in small installations. The accumulators, the action of which was discovered by MM. Faure and Plante in 1860, though they were not brought into a practical form until within the last ten years, consist of plates of metal placed in boxes made of glass or wood,—usually the former,—the glass boxes or "cells" being filled with liquid. They were chemical batteries, in fact, but batteries possessing peculiar properties. The name, "secondary batteries," explained somewhat the difference between them and the ordinary battery. The secondary could not generate a current on its own account, but could only hold or retain one with which it had been supplied. Another difference was that there was no consumption of its elements during its work of charging and discharging, although there was an actual deterioration which might perhaps be lessened by future improvements. The accumulators manufactured by the Electric Power Storage Company, Millwall, under various patents, were, the author understood, made in the following way:—Plates of prepared lead were perforated or indented all over, and the holes or indentations were filled with a composition consisting substantially of red lead for the positive or peroxide plates, and with litharge for the negative plates. The plates were then "formed" by means of the electric current, and then placed in the glass cells, so many positive and so many negative, all the positive being connected together and also all the negative. The cells were then connected up together, the positive plates of one cell to the negative of the next cell, and so on. The cells were then filled with a solution of sulphuric acid and water, in the proportion, roughly, of 1 of acid to 7 of water. The ends or terminals of the cells were attached to the wires from the dynamo, the action being that when the armature of the dynamo was rotated, the current driven into the plates caused a chemical action to take place, the result of which we saw in the fact that when the dynamo was stopped, a current could be obtained from the cells sufficient to light the lamps without the intervention of the dynamo at all. The great advantage of the secondary battery was that the light could be used at any hour of the day or night, and the light was the very best that could be produced. But, as in every form of transformation of energy, there was a loss in using storage batteries, and they of course added to the cost of an installation. Completeness, however, must always be paid for, and private house lighting could never be thoroughly satisfactory without the use of accumulators. The loss entailed by their use amounted to about 20 per cent. of the energy stored. With regard to the maintenance of storage batteries, they could be kept in working order for from 11 to 15 per cent. per annum on their first cost. Accumulators should not be allowed to run down; they lasted longer when used regularly than when used and left uncharged intermittently. They should always be kept well charged, and when not in use charged, say, once a fortnight, until the bubbles rose to the surface of the liquid, which should always cover the surface of the plates, the evaporation being made up for by adding water. The cells should be kept in a cool place, not above 65 deg. Fah., and never in the hot engine-room. Ample provision should be made for the ventilation of the accumulator-room, so as to get rid of the disagreeable fumes of the acid solution. The number of cells required in an installation depends upon the description of lamp used,—how many volts it was made for. The size of the cells depended upon the number of lamps required to be in use at the same time. In an ordinary house, as a rule, less than twenty cells would be of no use, as the electro-motive-force of each cell never exceeds about two volts.

4. *Wiring.*—The work of "wiring," or putting in the mains to distribute the electricity to the various points where the light was required was the first item in which the cost of labour formed a consideration. What was required was the most perfect conductor, *i e*, a conductor capable of conveying the current with the least possible loss, for there was always some loss. The metals which were good conductors were silver, copper, gold, zinc, platinum, iron, &c. Copper was usually used, it being comparatively cheap, very pliable, and lasting. Iron would do very well, but an iron wire to convey the same amount of current would have to be about six times the sectional area of a copper conductor. Therefore iron was not used except in some special instances. The copper conductor did not consist of one wire, but of a number of fine wires twisted together, which not only made the conductor more pliable, but gave a much greater surface-area, which was a *desideratum*, for electricity was said to affect surface. Upon the purity and gauge of the copper wire, and the amount and quality of the insulating material, depended the good or bad results obtained in wiring a house, and upon them depended also very largely the question of cost. In many instances the estimate for wiring was based upon the number of lights. The cost of wiring varied from 17*s.* 3*d.* to 40*s.* per light. Either these figures did not represent work of the same quality, or the higher estimates must include more than a fair working profit. It was most important that the wires should be large enough to carry the requisite current, and, in the case of a private house or public building, to carry such additional current as might at any future time be added. People who had electric lighting in their houses were too fond of adding extra lights, until the wires were so hard-worked that they became hot, set the house on fire, and acquired a bad character. The Phœnix Fire Insurance Company had issued a set of regulations which were looked upon as a sort of standard; and the London County Council had just issued new regulations for lighting theatres and music-halls by the electric light, but he did not think that a single theatre in London complied with the standard in every particular. Great care must be taken with the joints in the wire: bad joints were a frequent source of danger. He was under the impression that wires well twisted together, and then carefully soldered, made a good joint, but the County Council's regulations (last item in clause 3) said that "joints in conductors shall be avoided" (there was a charming simplicity about that), "but

where unavoidable they shall be electrically and mechanically perfect. Soldering fluids shall not be used in making such joints." Did "soldering-fluids" mean the solder itself or the fluid put on as a flux? There was some ambiguity about the regulations. Wires should never be fixed behind plaster or in the thickness of the plaster, but they should be in wood casings, made with grooves to receive the wires. The London County Council regulation said that such casings should be of "hard wood." Such casings should always be screwed together; nails should not be allowed, as they were liable to damage the insulation or even the wires. It was absolutely necessary that the wires should be kept dry. Water was an admirable conductor, and if it got to the wires the current would go to earth. If the wires were fixed in inaccessible positions and damp got at them so as to cause a leak, the only way to get out of the difficulty was to cut off the wires and run new ones. In Messrs. Andrews's system of concentric wiring there was a copper conductor or wire, insulated, and then, wound round the insulating material was a series of iron wires forming the return, the latter not being covered in any way. It was said that that system did away with the necessity for casings, and had other advantages. The difficulty heretofore existing with the system had been as to making the branch joints, but Mr. Andrews claimed to have got over all trouble in that way now. There were several methods of arranging the wires between the dynamo or accumulators and the lamps. The most usual way, perhaps, was that known as "in parallel" Another plan was the "series" system, in which the lamps were arranged one after the other on the same wire, but that plan was more usual for arc lighting. Another method was that known as "the three-wire system" which had been adopted by the Parish of St. Pancras in their public supply installation, and by other companies. Switches were in electric lighting work what gascocks were in gasfitting work,—they were simply a means of turning the light on or off. The best switches were those known as the "quick-make, quick-break" switches, for it was of great importance and essential to safety that connexion should be made and broken instantly. The "cut-out" or safety fuse was a great safeguard in electric lighting,—in fact, the safeguard,—but in some cases it was much abused. In such cases, instead of being a trusted servant it was an insincere friend, lulling its users into a sense of false security, and then setting the house on fire. The idea was that each wire was intended to carry a certain amount of current in excess of what normally passed through it. When a too powerful current passed it heated the wire, sometimes melting it and causing a fire. To avoid that, at certain points short lengths of soft metal are fixed in suitable enclosures, and when the current became too strong, usually by accident, the soft metal melted, broke the connexion, and everything was right, except, of course, that all the lamps on that circuit went out. A new length of soft wire could easily be put in. The danger was when the soft metal was too large and would carry too much current: then it ceased to be a safety fuse, and became an element of danger. Every "cut-out" or safety fuse should be made exactly to suit its intended position, and should not be left to the discretion of the men who did the wiring, who often knew nothing about electric lighting. The "cut-outs" should be real ones, not shams, and had better be fixed on the switch-board or in some other accessible place, instead of on ceilings or high up on the walls, where they were difficult of access.

5. *Lamps*.—The lecturer next described the incandescent lamps, the cost of which he stated to be about 3s. 6d. each at present, though after the date of the expiry of the Edison-Swan patent, in December next, the price would perhaps be reduced to 2s., or less. The average life of an incandescent lamp was usually stated to be 1,000 hours; what was meant was probably that at their best they lasted as long as that. But sometimes the filament of carbon broke before they had been in use ten or twelve hours, though that was not usual if the current were steady, and did not vary its electromotive force. Jars or shocks would, of course, break the filaments, so that the lamps should not be hung on door-frames where the doors were likely to be banged or slammed. As an incandescent lamp became old it gave less light, and the glass became black inside, owing to the deposit of minute pieces of the carbon filament. With regard to the design of fittings, much remained to be done by architects.

In conclusion, the lecturer referred to several practical points in some detail. Referring to some specimens exhibited, he said that the wooden casings for wires made by Mr. Fawkes, of Chelmsford, embodied an admirable idea. But where these casings were screwed up, the screws should be oiled before being driven, and not driven in too tight. After dealing with the question of the measurement of electricity, he entered into calculations of the cost of a 50-light installation, each light being equal to 16 candles. His estimate was as follows:—Engine, 138*l.*; dynamo, 30*l.*; accumulators, 126*l.*; fitting of engine, dynamo, &c., 20*l.*; wiring and switches, 30*l.*; fittings, 20*l.*; total, 364*l.* In planning the engine-room, it should be remembered that the longer the driving-belt the better, as it would run looser, last longer, and give less trouble. It should be at least 14 ft. long. No trouble should be spared in bedding the engine and dynamo so that they might be perfectly firm, and the dynamo must be completely insulated. Entering into figures, the lecturer calculated that the cost of working such an installation as he had described would be about 67*l.* 10s. per annum. For that sum they would get 20,857 hours' light of the very best sort, the cost per hour (*i.e.*, the cost per hour for every hour that one 16-candle lamp was alight) being a trifle over ¾d., including depreciation of plant. The cost of an argand gas-burner would be about ¼d. per hour. Time did not permit the lecturer to go into the cost of the light produced by any of the primary batteries before the public, which were generally, in his opinion, unsatisfactory for lighting purposes.

Mr. R. Langton Cole proposed a vote of thanks to Mr. Clarke for his interesting paper. It happened that he (the speaker) had been obliged to know a good deal about electric lighting, and he could therefore bear witness to the care and trouble the lecturer must have taken in bringing such a mass of detail before them. He thought the temperature of that apartment (the Institute meeting-room) was an eloquent testimony to the sanitary value of the electric light, for though he had never felt cold in it before, he wished that he had not taken off his overcoat. As to the difficulty in securing good insulated wire, his advice was to get the "Silvertown" list,—and no doubt other makers issued similar lists. That list gave the sizes and class of insulation of all wires made, and the architect could specify the wire he wanted, and obtain samples direct from the makers to compare with those supplied by the contractor. Then there was the Electrical Standardizing Institution, which, for a small fee, would test wires or instruments submitted to them, and he saw no reason why architects' specifications should not contain a clause like that usually found in reference to Portland cement, thus:—"The wires shall be tested at the expense of the contractor." He thought Mr. Fawkes's moulded casings excellent, but it was curious that the covers were all screwed in the centre, although he quoted, in his preface, the Phœnix rule, that all covers should be screwed at the sides. A small point about switches was that it was good to have a luminous tablet over them like those used on match-boxes; examples could be seen at the Crystal Palace Exhibition; and, as to cut-outs, it was just as well not to replace a burnt-out fuse without finding why it failed, as its failure was meant to be an indication that something was wrong. He quite agreed that every architect should design the fittings he required, but there were several points which must be attended to to ensure success.

Mr. C. Stanley Peach, in seconding the motion, said there could be no doubt that it was very desirable that architects in the present day should devote some attention to the study of electric lighting. He believed that electricity was at present merely in its infancy, and that there were many important developments before it.

Mr. Beresford Pite, in supporting the motion, said they were very much obliged to Mr. Clark for his paper, and to Mr. Langton Cole for his supplementary remarks. The profession was much indebted also to Mr. Cole for his writings in the "British Almanac and Companion." In the course of his remarks Mr. Pite strongly criticised the way in which some details of the electric-light fittings of the Institute meeting room had been carried out, to the disfigurement, as he thought, of the architectural details. He thought that some of these details might have been made far less obtrusive under proper direction.

Mr. A. H. Clark and another member having made a few remarks,

The President put the vote of thanks to the meeting, and, Mr. Max Clarke having replied to several points raised in the course of the discussion, the meeting terminated.

Discussion Section.—The seventh meeting of the Discussion Section of the Association was held on the 17th inst., when Mr. W. Pywell, A.R.I.B.A., read a paper on "Flues and Fireplaces." The Special Visitor for the evening was Mr. E. Prioleau Warren. There was a good attendance, and an excellent discussion followed the reading of the paper, in which Messrs. A. H. Clark, T. E. Pryce, H. A. Satchell, and F. T. W. Goldsmith (chairman) joined. Mr. Warren then dealt with the subject very fully, and his practical and suggestive remarks were much appreciated. The paper was well illustrated, a capital collection of sketches and photographs being exhibited.

DEMONSTRATIONS ON GREEK SCULPTURE AT THE BRITISH MUSEUM.

In her third lecture,* Miss Eugénie Sellers dealt with the sculptures of the Temple of Apollo Epikourios at Bassae, near Phigaleia. It has been generally held that this temple was built in gratitude to Apollo for the escape of the inhabitants from the great plague of 430; but, as Attic artists were employed upon it, it seems more likely that it was connected with a plague in the year 420, of which we have scantier notice, by which time the scene of the Peloponnesian War had shifted from the Peloponnesus.

The plan of this temple is peculiar, for it has an inner cella, lying north and south, which is open to the sky, while it has been shown by Dr. Dörpfeld that it was usual for temples to be wholly closed and lighted only by the central door in front. But behind this cella is a small chamber, lying east and west, which is completely closed, save for a door in the eastern side. This must have been the original temple, containing the statue of Apollo, to which the cella served as a sort of courtyard. On the inner side of the cella are buttresses terminating in columns that have their origin in rough buttresses like those which prop the walls on the inner side of the court of the so-called palace of Priam at Hissarlik, and which were retained when later such a court formed the plan of a temple of a god.

The frieze, which is very high relief, runs round the inner side of the cella, where it would be seen in the full daylight. On two sides are represented the battle of the Centaurs and the Lapithæ, and on two that of the Greeks and the Amazons. The arrangement of the slabs is somewhat difficult. According to Mr. Murray, the group of Apollo in his chariot would form a centre-piece; but possibly its function is rather to form a link between the two subjects.

As a composition it is very successful. The subject lends itself to the formation of small groups, with interlacing lines—a scheme of decoration which suits the ribbon-like space of a frieze better than the rapid flow of the Parthenon frieze, with its somewhat inadequate centre. The figures are full of life and power, though the workmanship is often rude and coarse. The passion of the Centaurs, contrasting with the comparative lifelessness of the Centaurs of the Parthenon metopes and the pathos of some of the Amazon slabs, are very remarkable. Here, too, we find perspective being applied to sculpture, and we notice a development of the pictorial element in the evident dislike to empty spaces and the devices framed to get rid of them. In conclusion, Miss Sellers referred the popularity of these two subjects with Greek sculptors to the variety of treatment of form offered by the contrast of male figures with those of women and of Centaurs.

Birmingham Association of Students of the Institution of Civil Engineers.—A meeting of this Association was held on the 18th inst. at the Midland Institute, the President, Mr. J. Edward Willcox, A.M.I.C.E., being in the chair. A paper was read by Mr. H. W. Butler, Student Inst.C.E., on "The Maintenance of Roads," which was followed by an interesting discussion.

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* For brief notes of previous lectures see p. 142, *ante*.

THE ARCHITECTURAL ASSOCIATION'S SPRING VISITS:

THE IMPERIAL INSTITUTE.

THE Imperial Institute at South Kensington as usual attracted a large number of members of the Association on Saturday afternoon last, when, by the kindness of the architect, Mr. T. E. Collcutt, an excellent opportunity was afforded of carefully inspecting this interesting building. Considerable progress has been made since the visit of the Association last year; and, though glimpses of the finished work of the interior can now be obtained, the plant and scaffolding stand somewhat in the way of a definite opinion upon the finished aspect of the work. The building is expected to be opened sometime in June, and by then more than three-fourths of the proposed buildings will be nearly completed. The long gallery at the back of the building is in an advanced state, and the portions that will remain incomplete for a time are a wing at each end, the continuation of the central hall opposite the entrance, and the grand staircase. The scaffolding of the front elevation is gradually being removed, and gives a better opportunity of judging of the exterior. This is chiefly marked by the extreme delicacy of the detail, and, though it is generally most graceful, it is to be feared that the fineness of much of the detail will be materially obliterated by the sooty weathering which so soon overtakes every stone building of this murky metropolis. To the same cause must be ascribed the dead colour of the copper, which is largely used on the numerous cupolas. The prevailing fineness of detail is in the interior of the building seen to much greater advantage, and appears in this position to be much more suitably employed. The Hopton Wood stone lining to the corridors is distinctly pleasing in its effect, and the capital light provided throughout shows to the best advantage the care that has been provided upon the detail.

Messrs. Mowlem are the general contractors, and some excellent specimens of their work were seen. Mr. Wallace, the clerk of the works, conducted the party over the works. It may be mentioned that some of the corridors are laid with glass mosaic. This would have doubtless received more attention had the representative of the firm who laid it not been so conspicuously present.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

AT the meeting of this Association on the 17th inst., Mr. J. W. Grover, F.S.A., in the chair, Mr. Macmichael read some notes on hair-curlers of the seventeenth century, used for the preparation of the long ringlets or "heart breakers" worn by ladies, and the wigs worn by men, a large collection of the clay curlers being exhibited. Some notes on the ancient signs of London were also read. Mr. Marriage exhibited a fine example of Egyptian bronze. The Rev. W. S. Sykes exhibited a remarkable prehistoric hatchet, 14 in. long, formed of calliard, a white slate-stone of the locality. It has recently been found at the Crow's Nest Farm, Lawkland, Settle. The Rev. Carus V. Collier reported the opening of a barrow at Bradwell, Derbyshire. Three skeletons have already been found within it, two being on their sides with the knees bent up to the chins. They were surrounded by a low wall or cist of flat stones on their edges. Many bones visible in the part not excavated appear to be from older interments. A paper was then read by Dr. A. Fryer on the present condition of the ancient church of Perranzabuloe, Cornwall, which was excavated from beneath a great drift of sand. The ruins are very greatly reduced in height. The paper was illustrated by photographs. In the discussion which ensued, Mr. Loftus Brock, F.S.A., and others took part, and Mr. Langdon described the process by which a large portion of the locality has been invaded and covered by sand slowly blown from the sea-shore. Mr. Park Harrison then reported his recent discovery of traces of the old Saxon church, now Oxford Cathedral. Some of the shafts of what was believed to be a triforium of Norman date in the south transept are found to be grooved for the frames of windows, the grooves being continued through the bases and in some of the arches, but not in the capitals, which are probably Norman insertions in what appear to have been some of the ealier Saxon windows of the older church. Several drawings were exhibited. The Chairman described some objects of antiquarian interest noted in his recent journey to the Azores and America.

THE LONDON COUNTY COUNCIL.

PRIOR to the commencement of the proceedings of the meeting of the London County Council on Tuesday last, the Chairman, Sir John Lubbock, unveiled a bust of the late Mr. J. F. B. Firth, the first Deputy Chairman of the Council. The bust, which is by Mr. Verheyden, stands in a corner of the Council Chamber.

The London Water Question.—The Chairman said that on Friday in last week it came to his knowledge that the Birmingham Corporation had put down their Water Bill for second reading on Monday last. The Council had passed a resolution to petition against the Bill, but he was not quite sure whether the Council desired to oppose the second reading. At the same time, having regard to the importance of the question, he thought he ought not to allow the second reading to pass unquestioned. He conferred, therefore, with the member in charge of the Bill, who consented most courteously to defer the second reading until next Monday. He (the Chairman) then asked the metropolitan members of Parliament, with some members of the Home Counties County Councils, to come to a conference in that chamber. They had a rather large meeting there on Monday, and considerable discussion took place on the question. He thought they all felt that if they were to proceed as against the Birmingham Bill it was desirable that they should do so with the support of the metropolitan members, or allow them to co-operate in the matter. Eventually the conference appointed a committee, comprising several members of the Council,—Mr. Lawson, M.P., Lord Compton, M.P., and Mr. Dickinson,—to confer with the Birmingham representatives, and it was hoped that some amicable agreement would be come to. While they did not wish to oppose any Bill which was promoted by Birmingham, they felt that, having regard to the recommendations of the Committee of the House of Commons on the London Water Question, they could not allow the present Bill to pass unquestioned.

Sewage Precipitation Operations during 1891.—The Main Drainage Committee's report contained the following:—

"We submit for the information of the Council a statement as to the results of the operations at the sewage precipitation works at Barking and Crossness during the year ended December 31, 1891.

At the Northern outfall at Barking Creek 30,172 millions of gallons of sewage have been treated by means of 8,516 tons of lime and 1,563 tons of sulphate of iron, which operation resulted in the production of 536,000 tons of sludge, which were sent to sea by means of the two steamers. During the summer 500 tons of manganate of soda, and 347 tons of sulphuric acid were employed in deodorising mainly that portion of sewage which was untreated by precipitation.

At the Southern outfall at Crossness 2,228 millions of gallons of sewage were only partially treated with 407 tons of lime an d 113 tons of sulphate of iron, which yielded 46,873 tons of sludge. If the ships had been available for carrying to sea a larger quantity of sludge than the above it could readily have been obtained at this station, but in consequence of the whole of the vessels' carrying capacity being required at the Northern outfall, precipitation operations at Crossness were entirely suspended on August 5. The untreated sewage discharged at Crossness during the summer was deodorised by means of 923 tons of manganate of soda and 532 tons of sulphuric acid.

In consequence of the better system of working at the Northern outfall during the latter portion of the year the percentage quantity of sludge (corrected to 90 per cent. moisture) obtained from the sewage rose from 0·28 per cent. in 1890 to 0·36 per cent. in 1891 for the whole year, which is in itself evidence of the better working of the system, as the theoretical quantity obtainable on the assumption that 30 grains per gallon are precipitated, is 0·43 per cent. In addition to the sludge at the Northern outfall, 2,691 tons of filth have been removed by means of the filth hoist and gratings and entirely consumed by means of the destructor; 5,106 tons of sand were also removed from the precipitating channels.

The cost for lime used at both outfalls during 1891 was about 8,146*l.*, and that for sulphate of iron about 3,184*l.*, as against 7,034*l.* for lime and 2,692*l.* 10s. for iron in 1890.

The cost of manganate of soda and sulphuric acid used at the outfalls and storm overflows was 27,525*l.*, the great bulk of which will be saved as soon as the precipitation operations are in full working order. The cost for the year 1890 was 24,560*l.*

The following is a comparative statement of the quantities of the materials used in the years 1890 and 1891:—

Northern Outfall:—

	1890.	1891.
Quantity of sewage treated	35,093 mil. gals.	30,172 mil. gals.
Sludge obtained	449,500 tons.	536,000 tons.
Filth destroyed	—	2,691 ,,
Sand removed	—	5,106 ,,
Lime used	8,638 ,,	8,516 ,,
Iron used	1,362 ,,	1,563 ,,
Manganate of soda	427 ,,	500 ,,
Sulphuric acid	311 ,,	347 ,,

NOTE.—The works were in an incomplete condition during 1890, the improvements in methods for collection of sludge at the Northern outfall having been brought into action in August, 1891.

Southern Outfall:—

Quantity of sewage treated	3,370 mil. gals.	2,228 mil. gals.
Sludge obtained	61,735 tons.	46,873 tons.
Lime used	924 ,,	407 ,,
Iron used	158 ,,	113 ,,
Manganate of soda	1,054 ,,	923 ,,
Sulphuric acid	379 ,,	532 ,,

The report was agreed to, and after transacting other business, the Council adjourned.

COMPETITIONS.

DARWEN TECHNICAL SCHOOLS.—In reply to the advertisement for competitive plans, twenty-five sets were received. Mr. Murgatroyd, F.R.I.B.A., was called in by the Committee to make the selections. The design placed first is that of Mr. J. Lane Fox, of Dewsbury. The design placed second is by Messrs. Morley & Woodhouse, Bradford. The design placed third is by Messrs. Dunn & Watson, of London.

NEW POLICE-STATION, SHREWSBURY.—At a special meeting of the Shrewsbury Town Council, on the 22nd inst., Major-General Herbert moved that the plans of the new police-station, sent in by Mr. Johnson, of Westminster, and selected by the Watch Committee as the best, be adopted, and that Mr. Johnson be appointed the architect for the work, the cost of which will be about 3,000*l.*—Alderman Crump seconded the proposition, which was ultimately agreed to.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

THE twenty-fifth annual general meeting of the donors and subscribers of this Institution was held on Tuesday evening last at the offices, 21, New Bridge-street, Blackfriars, the President-elect, Mr. Colin Grant Patrick, in the chair, supported by Messrs. E. Brooks (Treasurer), E. B. Gammon, W. D. Gilbert, E. W. Holland, F. S. Oldham, H. W. Parker, E. S. Rider, J. A. Robson, E. C. Roe, C. K. Turpin, T. H. Winny, and other gentlemen.

The retiring President, Mr. Benjamin Hannen, jun., was accorded a hearty vote of thanks by the Committee, at their meeting held just prior to the general meeting, and in vacating the chair he expressed his acknowledgements to the officers and Committee for the methodical, businesslike, and economical manner in which the work of the Institution is carried on.

The Secretary, Mr. H. J. Wheatley, having read the advertisement convening the meeting, the minutes of the last annual general meeting, and of a subsequent general meeting, were read and confirmed.

Mr. Wheatley next read the annual report of the Committee, which stated that the income for the past year amounted to 806*l.* 0s. 9d., the largest total which it had yet been able to record. That amount was made up of 293*l.* 4s. in annual subscriptions, 406*l.* 18s. 6d. in donations, 103*l.* 16s. 1d. in dividends, and 2*l.* 2s. 2d. interest on deposit account. The sum expended was 455*l.* 0s. 1d., including 340*l.* paid to pensioners and 15*l.* given in grants for temporary relief. During the year one of the pensioners (Mrs. Olver) was removed by death, and another (Mrs. Hadrill) resigned, having re-married. The number of pensioners now on the books was sixteen, but the total number elected since the foundation of the Institution was 32; of these, 9 had died, while 7 had retired owing either to re-marriage or to improved circumstances in other respects. With reference to the orphan presentations (three in number) held by the Institution, the Committee report that the vacancy caused by the expiration of the school-term of Edith Friend was filled up during the year by the election of Cyril Ludford, who was now in the school. There was still a vacancy for another child, and the Committee were prepared to receive applications on behalf of orphans whose friends might wish to place them in nomination for the vacancy.* The Committee were also prepared to receive applications for two vacant pensions, the amounts granted being 25*l.* per annum to builders' clerks who might be eligible, and 20*l.* per annum to

* It may be as well to mention that only orphans of builders' clerks are eligible.

their widows. One applicant was already before the Committee. The thirteenth annual dinner of the Institution was held on April 6 last, under the presidency of Mr. Benjamin Hannen, jun., whose earnest appeal on behalf of the Institution was most heartily responded to, the sum of 433*l.* 16s. 6d. being obtained. The amount of 200*l.* placed on deposit in 1890 was last year brought into current account, and a further purchase of 500*l.* 2¾ per cent. Consolidated Stock was effected, bringing up the total Stock now held by the Institution to 4,150*l.* The Committee expressed their hearty thanks to the retiring President for the very practical help rendered by him to the Institution during his year of office, and announced that Mr. Colin Grant Patrick had kindly consented to accept office as President of the Institution for the ensuing year. According to the Rules, one-third of the Committee retired, but were eligible for re-election. In conclusion, the Committee acknowledged the help so steadily afforded to the Institution by the builders, architects, and merchants connected with the building trade, and expressed the hope that their support of so useful a charity would be continued.

The Chairman, in moving the adoption of the report, said he had accepted the position of President of the Institution with great pleasure, and would do all he possibly could to further its interests during his year of office. The Institution was one which was particularly worthy of support, and he trusted that it would continue to prosper.

Mr. E. C. Roe, in seconding the motion, said he thought it was a matter of great satisfaction that the Institution was able to fund money from time to time. They were very desirous, indeed, of increasing their funded property, so that in times of depression the interest of their funds might enable them to meet their liabilities and carry on the work of the Institution without relying upon current donations or subscriptions.

The report was unanimously adopted.

The new President having been elected, the other officers and the retiring members of the Committee were re-elected; and Messrs. S. J. Thacker and Thomas Stirling were re-elected auditors. Mr. Ernest S. Rider being also elected as an auditor in succession to his father, Mr. Thomas F. Rider, who has become one of the trustees of the Institution.

Hearty votes of thanks were accorded to the retiring President and other officers for their services during the past year, and it was announced that the annual dinner of the Association would be held on March 30.

Correspondence.

To the Editor of THE BUILDER.

CONCETE FOR ARTISANS' DWELLINGS.

Sir,—I have no recollection of seeing any statement as to experiments made with concrete beams where it was definitely proved that coke-breeze concrete was superior to gravel; nor would such experiments be very conclusive evidence unless the quality and fitness of the gravel employed were known. Some descriptions of gravel used for concrete prove totally unfit for the purpose, although apparently otherwise. If "Surveyor" refers to Colonel Seddon's experiments some years ago, I believe he will find the results went to prove that broken bricks or brick ballast made the best concrete for large span floors, and that one experiment therewith, a floor 17 ft. 6 in. by 9 ft. 9 in. between supports, and 6 in. thick, carried a load of 3 cwt. per foot superficial before it collapsed. But there is another difficulty with concrete floors formed of huge monolithic slabs,—viz., their tendency to develop cracks or fissures on their under sides, and which it seems impossible to entirely prevent; and although it is assumed these do not lessen the strength of the floor, it is a doubtful point.

The objects of postponing the layer of coke breeze are:—1. The mass of concrete when first deposited in place is in a quaggy condition and not in a fit state for depositing thereon the finer layer and accurately levelling it ready for nailing boards thereto; some portions might get disturbed and disarrange the accuracy required. 2. It would cause delay in performing the straightening portion of the work; men would of necessity be moving about thereon, and the initial set of the cement would be protracted; concrete should be allowed to rest as quickly as possible after being deposited in place. 3. The surface should be true, smooth, and free from defects when the boards are nailed thereon; this is not likely to be the case if workmen have been tramping on the floors soon after completion, and for a considerable time longer, as would be the case if the floors were finished when the walls were the right height to receive them, let them be covered up ever so carefully.

"Surveyor" asks if floors should be wetted directly after they are finished; it is desirable to do so, and keep them wet for several days, as the slower cement sets, in reason, the better; but not, on the other hand, to deluge the concrete with water before it has obtained its initial set and disturb the particles of cement.

Colonel Seddon and others have proved that it is quite practicable to make floors of 14-ft. span or more; but the point "Surveyor" appears to wish to ascertain is whether, in a general way, it is advisable. I think not; but I hope to see what others have to say relative thereto. I have made floors 12 feet by 10 feet clear of supports, and resting on walls on three sides only, without a failure.

With regard to coke breeze as an aggregate, it should be borne in mind that the good quality of concrete depends not only upon the affinity of the cement for the aggregate, but the inherent strength of the latter, and coke breeze does not stand high in this respect. If concrete made of one part of cement to seven parts of crushed bricks is broken asunder, it will be found that the fracture is a clean one,—*i.e.*, the particles are not disturbed, but the brick aggregate is divided wherever the line of fracture occurs,—and this points, I suggest, to the desirability of balancing, where possible, the tensile strength of the aggregate and the adhesive strength of the matrix. Coke breeze, as a rule, contains a great deal of dirty matter,—the products of combustion possibly,—and to fit it for concrete this should all be washed out, incurring much labour; being very small, too, in size, it needs more cement than a larger aggregate to secure as good results. These two drawbacks explain my former assertion, that "measured by strength, it is, perhaps, the dearest of any."

THOMAS POTTER.

Alresford.

LIVERPOOL MOTIVE POWER.

Sir,—When I revise, for publication in the "Proceedings" of the Mechanical Engineers, the paper on which you commented last week, I hope to explain some of the apparent inconsistencies and omissions to which you (writing upon a proof printed for the meeting) have called attention. It would have been much more satisfactory to me, and probably to everyone interested in the subject, if I had been able to reduce all the costs of work done to a common unit, and also to discuss the bearing of the facts upon the general question of distribution from a central station. But, if I had waited to do this, the paper would not have been written, and a promise would have been broken.

Some day, if other engagements will permit, I hope to deal more fully and comprehensively with this important and interesting topic; and, meanwhile, you have exactly appreciated my object in publishing "authentic data" for the use and benefit of professional men, who generally experience great difficulty in getting anything but "trial-trip results."

J. PARRY.

THE EXTINGUISHING OF FIRES.

Sir,—The use of mineral-oil lamps being so very general, the following incident may be suggestive to some of your readers:—

Last night, a large suspended oil-lamp fell in our library. The room was instantly a "sea of fire." Some members of the staff showed much presence of mind, and rushed for "hand-grenades," the use of ten or twelve of which extinguished the fire in five minutes, confining the damage to the room in question, although the flames had reached from floor to ceiling.

The points to which I think attention might be invited are:—

1. The lamp should have "extinguished itself" in falling. It failed to do so.

2. The "finest water-white oil" (the quality used) is supposed only to ignite at a very high temperature (we won't dispute about a few degrees). This took fire at once.

3. The hand-grenades (which have been rather depreciated, and which may or may not be of value in the open air, when the gas generated is promptly dispersed) certainly acted with magical effect within the compass of a large room.

Your readers will draw their own conclusions.

ROBERT JOHNSON.

The Colonial College, Hollesley Bay, Suffolk,
February 19, 1892.

Board School, Greenheys, Lancashire.—On the 18th inst., the Dean of Manchester (Dr. Maclure) laid the memorial stone of a new board school to take the place of three school buildings which have been condemned as unsuitable in the neighbourhood of Greenheys. The principal front of the new buildings is to Webster-street, Greenheys. The walls externally are faced with Ruabon stock bricks, being relieved with stone strings, heads, cornices, mullions, &c. An imposing feature is the central gable, and to the right and left dormers are placed, giving light to the covered portion of an upper playground. The main block of the building is placed in the centre of the site. Right and left are playgrounds for girls and infants, with entrances from Webster-street and Leaf-street. A cookery school-room and scullery will be provided. The whole of the space over the girls' department is utilised for a playground for the girls, a considerable portion at each end being covered. Accommodation is provided for 1,116 children. The works are being carried out by Messrs. William Southern & Sons, contractors, of Salford, from the designs and under the supervision of Messrs. Royle & Bennett, architects, Manchester.

The Student's Column.

WARMING BUILDINGS BY HOT WATER.

IX.

EXAMPLE WORKS (HORTICULTURAL)

(*continued*).

THIS next example, fig. 31, shows an apparatus heating two glass-houses, or what may more probably be the case,

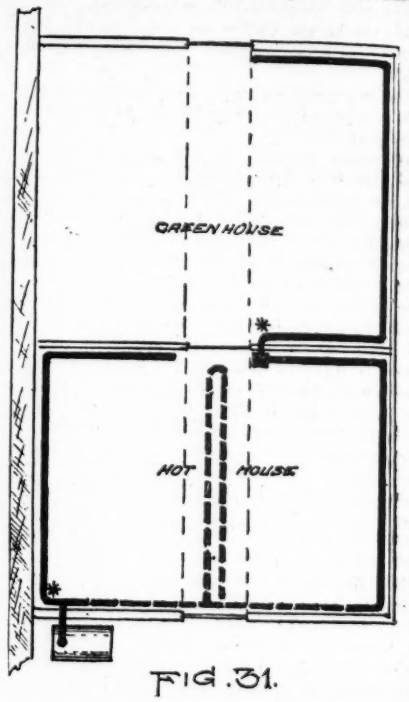

FIG. 31.

one glass-house with a division in it. The two parts of the house are used for different purposes, one as a hot-house for tropical productions, &c., and the other as a greenhouse, for more hardy plants that perhaps only require warmth at night or in winter. The boiler would, in this case, be brick-set, and situated in a pit sunk below the greenhouse level. There is no objection to an independent boiler, but when a pit has to be sunk, it is less expensive to use the other kind, and there is less risk of loss of heat. We are supposing this glass-house is not against a residence, but is of the lean-to character, and placed out in the garden. Even if against a residence it is doubtful if the boiler could be conveniently placed in a cellar, as this apparatus would need the regular attention of a gardener. Boilers in cellars or basement-rooms are generally attached to less important works, and are attended to by a page-boy or female servant.

It was just mentioned that this example is of an apparatus heating a greenhouse of the lean-to shape, bounded on one side by a wall, as fig. 32. This lessens the quantity of pipe re-

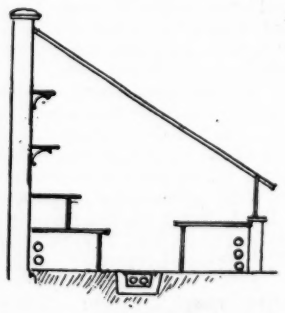

FIG. 32.

quired, for on the wall side no actual loss of heat occurs, and by this arrangement a deal of protection is gained by having the wall facing north or north-east if any way possible.

In the first house the pipes (only the topmost flow-pipe is shown on fig. 31) enter at the point shown on the left-hand side, but it would be arranged for them to come in below the level of the path or floor. By this means the branch required for the front of the house (the side opposite the wall) can be first carried along the end below the floor-level without dipping down anywhere, and so miss the doorway, which is sure to exist, as shown in the illustration. The pipes which are carried below the floor-level are

shown broken or dotted; those above the floor-level, solid.

As the first house is devoted to plants requiring a high temperature, we may consider that pipes along the front only would hardly suffice; so a branch along the back, *i.e.*, the wall, is shown. This being the side requiring the least heat, two pipes will, probably, suffice (as shown at fig. 31). This would be one flow and one return. Along the front three pipes (perhaps four may be needed) are carried, but the portion below the floor-level along the end, need only be but two pipes, branched into three or four as soon as they rise above the floor-level.

The two pipes up the centre of the house are a flow and return, also carried beneath the floor-level.

All pipes beneath the floor-level are, as a rule, carried in brick channels, with a grating at top. By this means the pipes, although not exposed, contribute to the aggregate results, although not in proportion to pipes that are exposed, as the rule that is to be given will show. The gratings which cover these channel pipes must be easily removable, so that the pipes can be brushed and kept clean. A dirty pipe, even with a little dust, loses in efficiency, as dirt and dust, of whatever nature, are nearly always composed of poor conducting materials, and go far towards preventing the pipes losing their heat. If only 2 ft. or 3 ft. of pipes were carried below the floor-level, then they could be covered over entirely, as no great gain would be effected by placing such a small quantity in a channel. If pipes are covered entirely, then it must be with some poor conducting material, sand or dry earth will do.

It is desirable to point out that showing a certain number of pipes, and pipes in certain positions, does not indicate that the work should be always carried out in this manner. The illustration is merely to describe possible ways of doing the work, if such ways are considered the best to meet the conditions. But in the majority of cases it is not for the hot-water engineer to arrange the disposition of the pipes at all; he may settle the quantity, but the gardener is the person who settles general questions, and he will decide where the pipes may be run and where not, In works of fair size the engineer's first business should be to confer with the gardener. The pipes and their disposition can then be arranged to meet all requirements to suit the purposes to which the houses are to be put, also as to avoiding vine-roots, trees, &c., should such exist or be likely to exist. Many gardeners are very skilled in planning these works; it is, to all intents, part of their business, and usually forms part of their training.

Both the front and back services in the hot-house are extended around and along the division, as far as the doorway. This may not always be necessary, although, as a rule, a tropical house wants a deal of pipe, and few

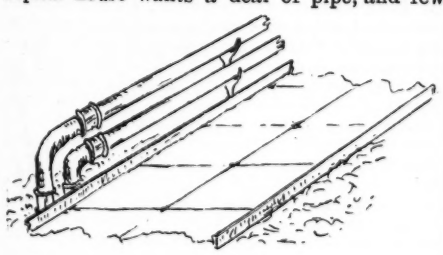

FIG. 33.

spaces are left empty. It is on this account a service is shown below the floor-level, up the pathway, although it is more often the inability to place the pipes against the walls, owing to

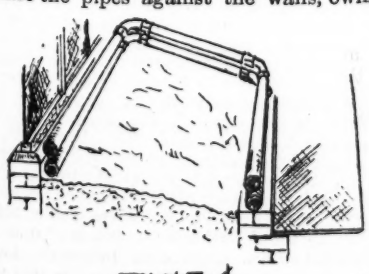

FIG. 34.

roots existing, that makes this plan necessary. Sometimes, if pipes cannot be carried close to the walls, they are run along the edge of the pathway, as fig. 33, or along the edge of a raised bed, as fig. 34.

The second house will probably be heated sufficiently by two pipes carried along the front, and extending to the division doorway and the end doorway as shown. These pipes are simply continuations of those along the front of the first house. To avoid ugly work just where the pipes pass through the division, there being three pipes in the first house and but two in the second, a box-end, as fig. 35, will be found very

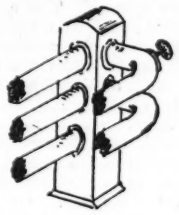

FIG. 35.

useful. The illustration shows exactly how the connexion is made; the whole of the box is in the first house.

As illustrated, it is customary to have the tropical house nearest the boiler, as it requires the greatest heat; the houses (if there are more than two) succeeding this are then placed in order of precedence as to the heat required. This is the usual plan, although, like all other rules, it has exceptions. When there are two or more houses, however, it becomes necessary to introduce stop-valves to regulate the heat in any particular spot,—that is, to check or retard the circulation as required. This regulation is needed, as the most careful measurement and calculations will not result in a quantity of pipe that will do the work exactly, neither too little nor too much. Then, again, as the weather changes, and as the growth of the plants or fruit proceeds, regulation of the heat is needful, and at various other times. With one house only the regulation is effected by checking or urging the fire, but this does not do with several houses, as it is certain that the heat of all houses will not require regulating at the same time or to the same extent.

In the apparatus under discussion a stop-valve would be needed in the flow-pipe just inside the second house, where marked * on fig. 31, and as shown in the last illustration. This would provide a means of checking the second house without interfering with the heat of the first; this will suffice, as the reverse of this would never be required with an apparatus of this character. It might also be desirable to put a stop-valve in the service against the back wall in the first house, where marked *, to prevent this short and direct service from "leading" the circulation, to the detriment of the longer services in the other direction. This valve might, however, be dispensed with if the service was kept nearly flat and a good rise given to the other branch.

In the whole of this apparatus 4 in. pipe would be used. No gain would be effected by using a smaller pipe between the boiler and the circulating pipes, the distance being so short. Smaller pipes,—say, 2 in.,—would be permissible if the distance was greater and the houses not very large. There is no need, however, for the stop-valves to be 4 in., they can be 2 in., the pipes being reduced to this size just where the valves come. This effects economy, as the valves are rather expensive. In larger works than this, it would be necessary not to use smaller pipes or valves than 4 in. anywhere, for, as explained in an earlier paper, the strength of the circulation, the motive-power, is very weak in horticultural works which are so deficient in vertical pipes, that is, of such little height. Air-tubes would be needed at each extremity and one on top of the box junction, fig. 35.

SURVEYORSHIPS.

LEICESTER.—The Leicester Corporation has, almost unanimously, increased the salary of Mr. E. G. Mawbey, the Borough Engineer, from 700*l.* to 1,000*l.* a year. Mr. Mawbey succeeded the late Mr. Joseph Gordon at Leicester about two years and a half ago, when that gentleman was appointed Chief Engineer to the London County Council.

THE CUTLERS' COMPANY.—Mr. Alex. R. Stenning, F.R.I.B.A., F.S.I., has been elected Surveyor to the Worshipful Company of Cutlers.

PULPIT, BRIDESTONE.—An oak pulpit has been placed in Bridestone Church, Devon, made by Messrs. Luscombe, of Exeter, from the design of Messrs. Tait & Harvey, The Close, Exeter.

GENERAL BUILDING NEWS.

PROPOSED RECONSTRUCTION OF GLASGOW COURT-HOUSE.—At a general meeting of the Glasgow Court-house Commissioners, held on the 18th inst., it was decided to adopt the plan prepared by Mr. Bell, of Messrs. Clarke & Bell, for the reconstruction of the Court-house and the provision of additional accommodation for the conduct of the business of the court. The plan deals with the premises at present occupied by the sheriffs, as well as those vacated by the Corporation, and involves the complete reconstruction of the building, at an estimated cost of 48,000*l.* The basement floor will be occupied mainly with fire-proof record rooms in connexion with the departments of the Sheriff-Clerk and the Justice of Peace Clerk. In addition it will contain a witness-room for the Justice of Peace Court, and there will be sixteen cells for the temporary detention of prisoners. In the Ingram street end of the ground floor accommodation will be provided for the Justice of Peace Court; and there will be rooms for the J.P. Clerk and Fiscal, as well as retiring-rooms for the justices. The Sheriff-Clerk's department will occupy the remainder of this floor, and here also will be refreshment-rooms and retiring-rooms for the agents. On the first floor there will be five courts for the Sheriffs-Substitute. Attached to each will be a retiring-room. Three spare court-rooms will be provided, in the view of the ultimate appointment of an additional Sheriff; in the meantime these would be available for other business. On this floor also will be placed the Sheriff-Principal's reception-room, the Ordinary Court, the Appeal Court, and the Jury Court rooms, with retiring-rooms for the judges in connexion with each. The Jury Court, where the criminal trials will take place, will have a gallery fitted up, to which independent access will be had by the general public. The Sheriff Small-Debt Court will continue to occupy its present position on the second floor, but the main entrance will be from Hutcheson-street, and improved communication with other parts of the building will be provided. The Sheriffs-Fiscal's department will likewise be located on this floor, and eighteen large rooms will be set apart for the conduct of business; while, for the reception of prisoners awaiting examination, six cells will be provided. The remainder of the floor will be occupied with agents' retiring-rooms, witnesses' rooms, and the offices of the auditor. The attic floor will probably be occupied by the house of the caretaker, with additional retiring-rooms, lavatories, &c. There will be entrances in the centre, both from Wilson-street and Ingram-street, which will be connected by staircases with corridors running round the building on each floor, with access to the various departments. There will, in addition, be elevators at both ends, running to the top of the building.

BUSINESS PREMISES, CARDIFF.—Some new business premises for the Atlas Furnishing Company have just been erected in the Hayes, Cardiff. The frontage of the premises is over 100 ft., and the extreme depth measures 160 ft. The building contains a basement, ground, and four floors. The front elevation is worked in white brick, with carved Bath stone facings, with polished granite pillars. The new premises have a basement extending 150 ft. back, and above this is a glass-fronted shop. There are also suitable offices and waiting-rooms, and on either side is a doorway,—on the left leading to the warehouses, workshops, packing-rooms, and stables; and on the right to an area in which lavatories, &c., are placed. The staircase gives access to the show-rooms above and also to the basement warehouse. Iron pillars form a central support to each succeeding floor. Behind the show-rooms are the warehouses and workshops, stables, and coach-house. The former measures 60 ft. by 40 ft., the workshops being comprised in the two upper stories. The front building is supplied with a lift, and the workshops with hoists. The premises were designed by Mr. J. P. Jones, of Cardiff.

CONGREGATIONAL CHURCH, NEAR ST. HELENS.—The new Congregational church and schools at Blackbrook, St. Helens, which were commenced in August, 1890, have just been completed. The architectural design is Late Gothic in character, the plan of the church being cruciform, having chancel and transept. The outside of the building is composed of Monk & Newell's Ruabon brick, with red sandstone facings, and the inside is of white Cefn stone. There are several entrances, the main one being in the front, and two on the sides. There are also rear entrances for the choir, &c. Internally, the clearstory is carried upon moulded arches, supported on octagon pillars having moulded caps and bases. On one side of the rostrum is the organ-chamber, and on the other side the vestry, with cloak-room in the rear. The internal woodwork is of pitch-pine toned and varnished, and the rostrum is constructed of selected pitch-pine. The traceried windows are filled with tinted leadlights. The church stands back from the main road, and has a tower and spire 120 ft. high. A drinking-fountain is let into the boundary wall. The Sunday school building adjoining consists of an assembly-room with accommodation for over 300 children, and boys' and girls' and infants' class-rooms. The architect has been Mr. Thomas W. Cubbon, of Birkenhead, and the con-

tractors Messrs. Hughes & Stirling, of Bootle. The work has been carried on under the supervision of Mr. A. Halsall.

WESLEYAN CHAPEL, BEVERLEY.—On the 10th inst. the new Wesleyan Chapel in Tollgavel, Beverley, erected on the site of the superintendent minister's house, and backing up to the old building in Walkergate, was formally opened. The building is from the design of Messrs. Morley & Woodhouse, of Bradford, and is in the Italian style. The chapel is designed to accommodate 100 more than the old building. A minister's vestry, inquiry-room, and kitchen are provided in the rear. The front entrance vestibule is reached by three doors, and has a tiled floor. The organ recess has pilasters with enriched capitals and trusses supporting an elliptical arch and pediment with enriched panels and cornices. The front gable windows are filled in with leaded glass. An open portico, with polished granite columns and circular arches, projects beyond the main line of frontage; the floor is laid with mosaic tiles, and the walls inside lined with glazed bricks. The total cost has been about 4,000*l.*

BATHS, STOCKTON.—The new baths of the Stockton Corporation were opened on the 19th inst. They have been erected on the site of the old baths in Portrack-lane, by Mr. Campbell, the Borough Surveyor. The building is of brick and stone, with wrought-iron roofing. There are two entrances, respectively for women and men, divided by the ticket or pay office. Above this is a series of first-class slipper baths for gentlemen, and also a vapour and a shower bath. Beyond these apartments is the new swimming or plunge bath. The height of this hall is 36 ft., and the width 33 ft. The length of the swimming bath is 75 ft., and its width 27 ft. It is 6 ft. 6 in. deep at the deepest, and 4 ft. at the shallow end, and holds 60,000 gallons of water, kept at an even and warm temperature, and also cleared of surface impurities by an arrangement of water sprays. The building contractor was Mr. W. C. Atkinson. The contract for the building and machinery was 6,448*l.*

RESTORATION OF MICKLEHAM CHURCH, DORKING.—On the 15th inst. the Church of St. Michael, at Mickleham, near Dorking, was opened by the Bishop of Winchester, after undergoing alterations and additions. New Norman arcades have been erected, and the north aisle has been enlarged. The galleries, which previously existed in the aisles, have been removed, and a lighter gallery placed in the tower above the chief entrance. The old-fashioned "box" pews have been demolished, to give place to seats of a more modern construction, and the arcades, which formerly stood in the nave on brick piers, have been taken away, and Norman pillars and caps substituted. New screens have been erected for the north aisle and the tower. The tower has also been renovated externally, the stucco having been taken off and the flint work brought out. The turret has been shingled and put in good order. A stained window, containing three lights, has been erected in one of the aisles in memory of the late Mrs. Gordon Clark. The work of restoration has been carried out by Mr. Shillitoe, contractor, of Bury St. Edmunds, the plans having been prepared by Mr. Ewan Christian, architect to the Ecclesiastical Commissioners, the cost being about 3,900*l.*

PROPOSED ARTISANS' DWELLINGS, DUBLIN.—On the 19th inst. Mr. C. P. Cotton, C.E., Local Government Board Inspector, held an inquiry at the City Hall, Dublin, in reference to the proposal of the Corporation to borrow a sum of 13,000*l.* to erect dwellings suitable to the working classes at Blackhall-street, Blackhall-place, and North King-street. Mr. Harty, C.E., Borough Surveyor, was examined, and stated that the place was suitable for the erection of artisans' dwellings, and there were large numbers of working people employed in that locality. He proposed to take down the old houses there, which were in a terrible state. There were various classes of houses to be built. Fronting Blackhall-street there would be shops, and there would be ninety-one tenements included in the scheme. The annual profit on the scheme, after paying for all outgoings, would be 56*l.* a year. Mr. Moore, on behalf of the Governors of the King's Hospital, Blackhall-street, objected to the scheme as regards the houses proposed to be erected at the rear of Blackhall-street, and also to the conversion of the houses in Blackhall-place. If the scheme were passed it would have the effect of depreciating the property of the Hospital, which was originally given by the Corporation. Other evidence having been given, the proceedings terminated.

METHODIST CHAPEL, WITHINGTON, LANCASHIRE.—A new Primitive Methodist Chapel was opened at Withington on the 14th inst. The building is of Gothic design, and consists of a chapel, Sunday-school, minister's vestry, and two class-rooms. The building faces Burton-road and Ashford-road. The walls are built of local bricks, faced with pressed Ruabon stools and bricks, relieved with terra-cotta dressings. The principal entrance to the chapel consists of an outer porch and a vestibule. The north and south aisles are approached from the vestibule. The chapel is capable of seating 300. The school-room, which communicates therewith, will accommodate 140, exclusive of the two class-rooms and minister's vestry. The walls of the chapel are wainscotted in pitch pine for some distance above the pew backs, and the pews and the flooring of the chapel are finished in selected varnished pitch pine. The roof principals, and the exposed portions of the roof timbers, are of stained pitch pine. The pulpit has been treated to imitate walnut, and is relieved with figured pitch pine panels. The windows of the chapel and school are fitted with leaded lights, glazed with tinted cathedral glass. The buildings are heated with hot water on the low-pressure system. The contract for the building was 1,600*l.*, and has been executed by Messrs. Burgess & Galt, of Manchester, in accordance with the designs and under the supervision of Mr. Joseph Swarbrick, of Manchester.

METHODIST CHURCH, RAMSEY, ISLE OF MAN.—On the 18th inst., memorial-stones of a Primitive Methodist church and schools were laid at Ramsey, Isle of Man. The church has been designed to seat 460 people, and the estimated cost is 1,700*l.* The architecture is Early English. On the basement there will be a schoolroom and three classrooms. There will be two aisles in the church, and the rostrum will be placed opposite the entrance. The ministers' and stewards' vestries will be behind the transepts, and the organ-loft and choir-gallery are to be placed immediately behind. The inside fittings will be of pitch-pine, and open-timbered roof. The architect is Mr. Thos. Howdill, of Leeds, and the builder is Mr. W. C. Southward, of Ramsey.

STAINED GLASS AND DECORATION.

WINDOW, PARISH CHURCH, GREAT HALLINGBURY.—A stained-glass window, which has been put in the east end of the Parish Church, Great Hallingbury, Essex, by Mrs. Houblon, to the memory of her husband, has just been dedicated. The window, which has been erected by Messrs. Clayton & Bell, of London, consists of three lights. In the centre is a representation of the Crucifixion, while on the right of it are depicted the three Marys, and on the left St. John, Joseph of Arimathea, and the Centurion. Above the centre light is represented Michael the Archangel.

WINDOWS, ST. JOHN'S CHURCH, RADCLIFFE.—A number of Munich stained-glass windows have recently been placed in St. John's Church, Radcliffe, in memory of the late vicar, the Rev. W. D. Carter, M.A. The subjects are "The Good Shepherd," "Christ's Charge to Peter," "The Pool of Siloam," and "Feeding the Multitude." Another memorial window has been placed in the same church in remembrance of the Rev. J. W. Taylor, who was the first curate-in-charge of the parish. The window has been presented by his only son, Mr. Alfred Kaye Taylor, Liverpool, and the subject is "The Good Samaritan." The windows, six in number, were supplied by Messrs. Mayer & Co., of Munich and London.

SANITARY AND ENGINEERING NEWS.

SEWERAGE WORKS, SWANSEA.—A Local Government Board inquiry was held at the Town Hall, Swansea, on the 10th inst., by Mr. Smith, Local Government Board Inspector, into the proposal of the Swansea Corporation to borrow 87,760*l.* for sewerage and other improvements in the borough. The Town Clerk explained the proposed works, which consisted of drainage works in the added area, a new main sewer and outfall at the western boundary of the borough, to carry off the sewage matter and storm-water for the St. Helen's district, &c.—Mr. Wyrill, Borough Engineer, explained the proposed works at Morriston, Pentrepoth, Brynhyfryd, Cwmbwrla, &c., and produced plans showing their outfalls into the Tawe or the existing sewers. With regard to the proposed western sewer, the Town Clerk explained that at Brynmill the proposed sewer was not carried to low-water mark, and that it would not be necessary to extend it so far. If it was insisted upon it would result in the total expense amounting to nearly 100,000*l.* Other evidence having been given, the inquiry closed.

COUNTY BRIDGE, WRITTLE.—The bridge which has been built over the river Wid, at Writtle, by the County Council, to replace the brick structure washed away by the flood of 1888, was thrown open for public traffic on the 15th inst. The bridge has been constructed from the designs, and under the superintendence of the Engineer to the Council, Mr. Percy J. Sheldon, Assoc.M.Inst.C.E. It consists of two steel girders, and a steel plate flooring, filled in solid with concrete. The parapets are of cast-iron of an ornamental design. The contractor was Mr. G. Watson, of Ilford, the steel and iron work having been supplied and fixed by Messrs. Westwood & Bailey, of London. The total cost is estimated at 3,000*l.*

ELECTRIC LIGHT IN AUSTRALIA.—Mr. E. R. Dymond has just contributed to the *Proceedings* of the Institution of Civil Engineers a paper in which he gives a description of the electric lighting at Tamworth, New South Wales. Although Tamworth has only a population of 4,000, and a rateable value not exceeding 33,700*l.*, its streets have been lit by electricity since the year 1888; and was, indeed, the first place in Australia to adopt the new system. The plant is in duplicate, and was sent out from England. There are 13½ miles of streets now lighted, the distance of the furthest lamp from the station being 2,100 yards. The average loss of pressure is stated to be not more than 5 per cent. In the main street there are four arc-lamps of 3,000 nominal candle-power each, which are worked in series off a separate cable. The other lights are glow-lamps. In the most important positions near the station, each lantern has three 75-volt lamps in series. As the distance increases, two 110-volt, and, lastly, two 105-volt lamps are used. All glow-lamps are 16 candle-power. There are 185 glow-lamps contained in eighty-six lanterns. The number does not seem great for the area covered, but in a modern town such as this the engineer can place his lights to much greater advantage, as the streets are straight and run at right-angles to each other, and, moreover, are spaced regularly, the rectangular blocks of houses being of uniform shape and size. The previous cost per mile of street lighted by gas equal to 94 candle-power was 56*l.* 19s. 10d.; whilst with electricity it is 51*l.* 2s. 8d., the light being equal to a standard of 219 candles. These figures will not, of course, afford any basis of comparison for English practice, where gas is so much cheaper, and where Board of Trade rules must be observed; but the author puts them forward as a fair example of country town lighting in Australia.

FOREIGN AND COLONIAL.

FRANCE.—The statue of Theophrastus Renaudot, said to be the founder of French journalism, will probably be placed on the open in space in front of the Marché aux Fleurs, near the Tribunal de Commerce.——The statue of Balzac, on which M. Rodin is now at work, is to be erected on the Place du Palais Royal, on the axis of the Cour d'Horloge.——The Société des Artistes Français has decided that the next Salon is to include a section of Decorative Art.——The Government is having two casts made from Rude's celebrated bas-relief, the "Chant du Départ," on the Arc de Triomphe de l'Etoile. One of these is to go to the Society of Arts of New York, the other the Trocadéro Museum.——The "Société Française d'Hygiene" will open this year another competition on various subjects connected with town and country dwellings. The competition is to be closed on July 1.——The Ministry of Public Instruction is preparing an inventory of works which are in the stores of the Louvre and for which no exhibition space is available. There are 146 of these hidden treasures.——Important restoration works are shortly to be commenced at the Palace of Fontainebleau. The Pavillon Serlio will be taken in hand first, and from thence the work will proceed in the Cour de Cheval Blanc, the pavement of which, worn by the carriages of all the generations since Louis XIV., has never been repaired.——The creation of a commercial and industrial museum has just been decided on at Toulouse, which will form a permanent exhibition of raw materials and their application to manufactures.——The competition for a museum at Bayonne has been a failure; one "second prix" was given to M. Planckaert, but nothing further has resulted from it.——The director of the Museum of Lyons has asked for the restitution of the panel painted by Perugino which decorates the central window of the nave of St. Gervais at Paris. The painting, representing the Lord surrounded by angels, formed once the crowning portion of a grand composition of which the remainder is in the Lyons Museum. In exchange, the Lyons Museum offers four very interesting views of Paris of the fourteenth century.——The Government is going to erect at Luneville a fort in béton constructed after the type of fortification made use of by the Belgian General, Brialmont, for the defence of the Meuse. The work will have two armoured cupolas.——The Government has allotted a credit of 3,250,000 f. for the expenses of the French representation at the Chicago Exhibition.——Mdme. Cogniet, widow of the celebrated painter, has died at the age of seventy-nine. She was herself a painter and exhibited in the Salons of 1835 and 1853 some *genre* pictures, under the name of "Caroline Thévenin." She obtained a medal in the Salon of 1843.——The death is announced also of M. Jacques Alfred Brielman, landscape-painter; a pupil of Laveille. He received a medal in the Salon of 1882. The last Salon contained two of his works.——It is proposed to organise this year an international exhibition of "Black and White"; a special section being devoted to a historical collection of engravings etchings and lithographs of the French, Italian, English, Dutch, German and Spanish schools.——It is proposed to construct a new Lyric Theatre at Paris on the site now occupied by the Eden Theatre, which will be pulled down.

BERLIN.—The Emperor has given some further attention to the "National Monument" question, and Herr Ziller has made some proposals relative to the position of the monument on the very difficult site in front of the royal castle. The Emperor entered into a lengthy discussion of the merits of the different proposals.——The sarcophagus of Emperor Frederick III. has been placed in its position in the new mausoleum near Potsdam. Reinhold Begas was the sculptor, and his work is considered to be a great success by those who have

seen it. The mausoleum is to be open to public inspection next month.——The older of the two architectural societies, the "Architektenverein zu Berlin," has elected Baurath Hinckeldeyn as president for the coming session.——The "Allgemeine Elektricitaets Gesellschaft" (who are now remodelling their design of the proposed underground metropolitan railway in accordance with requirements made by a special committee) intends constructing a specimen piece of tunnelling for the purpose of demonstrating that no technical difficulties oppose the carrying out of their electric railroad scheme under the main thoroughfares of the city.——In one of the suburbs of the city a batch of villas and cottages is being put up in Norse style. A Swedish builder sends the logs and fittings for each residence ready for putting together, and supplies the artisans necessary for the work from his own country.

VIENNA.—The Ferdinand Bridge over the Danube Canal, which will have to be replaced by a new crossing (bearing the same name), is to have a row of shops on either side of it, and its footways covered in with arcades. The reasons for erecting the shops are purely financial, as the rents to be obtained are to cover the expense of the reconstruction of the thoroughfare. The design for the new bridge is by "Baurath" von Wiekmannsand, engineer. Vienna, which city since December last calls itself "Gross Wien," and, after having acquired the whole or part of the ground of some sixty neighbouring parishes, can boast of a superficial area of 177 square kilomètres (*i.e.*, 120 more than it had before), and a population of 1,300,000 (instead of 800,000), will now undergo some important changes as regards sanitation, canal regulations, and local railway intercommunication. The alteration and extension of the sewage system, which includes the construction of two main sewers on either side of the Danube canal, will cost over eleven million florins, and will have to be ready by 1895. The Danube canal, a channel of some 15 kilomètres length, is to have new embankments, and is to be used as a harbour for the river shipping. The proposed new railway intercommunication will be brought about partly by constructing several minor lines between the terminal stations of the different great railroads which run into the city, and partly by the construction of some secondary, purely local roads. Up to but a few years back Vienna took a most prominent position in the erection of public buildings, architectural monuments of the largest scale, grouped together in an imposing way. This period of activity in architecture having come to an end, another, in which the civil engineer will play the leading part, is apparently about to commence, and, from all appearances, promises to be a most important one for "Gross Wien's" development.

NORWAY.—The Corporation of Christiania, not wishing the city to be disfigured by the usual tall, ugly chimney-stacks of electrical stations, has offered three prizes for designs for the chimney-stack of the new municipal central station now in course of construction, the jury having been named by the Association of Engineers and Architects of Christiania.——The Norwegian production of bricks last year was about the same as in the preceding one—viz., about forty millions; and the out-turn of calcined roof tiles about one million, against about 800,000 in 1890. The demand for bricks was brisk during summer and autumn in Christiania, where the principal kilns are found, owing to considerable building operations. In consequence, stocks are now small. The price of bricks remained steadily throughout the year at 24 kr. (27s.) per thousand, a price leaving a good profit. For red calcined roof tiles the price varied between 40 kr. and 44 kr. per thousand (55s. and 59s. 6d.), being about the same as in 1890. Wages rose further still last year, although a steady rise has taken place during recent years. However, during the last few months of 1891 and up to the present the demand for bricks and tiles has fallen off, owing to the monetary crisis prevailing. There were imported into Christiania in 1891 about 11,000,000 bricks from other parts, about 800,000 fireproof bricks from abroad, and about 150,000 roof tiles. The Norwegian stone industry flourished fairly well in 1891, the demand for granite of various colours from this and other countries being good.——From the report for 1890 of the Society for the Preservation of Norwegian Ancient Memorials it appears that fourteen old churches were examined and partly restored, and thirty-eight barrows excavated, but the finds were of little value. The excavations of Lyse Cloister were continued, and the ruins enclosed. The Society attempted in vain to purchase for the Christiania Museum a remarkable reliquary preserved in the Hedal Chapel, upon which is represented in relief the murder of Thomas à Becket, but it was permitted to take three casts of it for the museums of Christiania, Bergen, and Throndhjem.

CONSTANTINOPLE.—The idea of bridging over the Bosphorus for railway traffic has often been spoken of. There is now some chance of it being done if the financial arrangement can be managed.——Messrs. Giano and Gourrée, two engineers resident in the city, have designed a railway-bridge which is to cross the straits from Stamboul to Scutari. This design has been put before the Government for approval. The length of the bridge, including viaducts at either end, is 2,000 mètres; the central span measures 1,400 mètres. The floor of the bridge will have a width of 15 mètres, and its altitude over average water-level will be 40 mètres.—*Deutsche Bauzeitung.*

NEW SOUTH WALES.—The Minister for Works has appointed Mr. Horbury Hunt (President of the Institute of Architects of New South Wales) to act with Mr. Vernon (Government Architect) and Dr. Manning (President of the Board of Health) to report on the competitive designs for the Rossiville Asylum buildings at Goulburn; and Mr. Wardell to act with Mr. Darley (Engineer-in-Chief for Harbours and Rivers) and Mr. Hixson (Engineer-in-Chief for Roads and Bridges) to report upon the designs for the new Pyrmont Bridge.

MUNICH.—The arrangements for the "International" Art Exhibition to be opened here next summer are most elaborate, and promise well. Of the countries invited to exhibit, Austria has already accepted, and its Government has voted 5,000 florins towards the expenses of fitting up the hall of its section. Japan is to have a section, and a great novelty, in form of a room devoted entirely to architecture, is proposed. We hope that there will be some English work to be seen in the exhibition.

MISCELLANEOUS.

SALES OF PRINTS, ENGRAVINGS, &C.—Last week (Feb. 18-19) Messrs. Sotheby, Wilkinson, & Hodge sold the remarkable collection, formed by Dr. Joly, of Dublin, of the works of Hogarth, and books in connexion therewith. One lot, bought by Mr. Quaritch for 500*l.*, consisted of twenty-five volumes, atlas folio size, containing about 158 drawings and 6,097 prints, being nearly the whole of Hogarth's engravings, and after his designs, with no two prints (plate impressions excepted), in exactly the same state included. Vols. i. and ii. were compiled for Lord Charlemont (Hogarth's patron) by R. Livesay; vol. iii. is the Kingsbury Collection,—86 prints. Similar folios, of the same size, by T. Cook, J. Nichols, J. and J. Boydell, with others, were also sold. Of the books we may mention,—Allen's "Lambeth," 1827, 5s.; "Apuleius; or, The New Metamorphosis," 1708, 1*l.*; J. Ashton's "The Fleet: its River, Prison, and Marriages," 1888, with M. Jackson's "History of the Pictorial Press," 1885, 16s.; A. W. Tuer's "Bartolozzi and his Works," parchment, 1885, 7s.; three copies, fol. size (two with faults), of G. Bickham's "Musical Entertainer," 8*l.* 11s.; Butler's "Hudibras," on large paper, sixty portraits by R. Cooper, India proofs, fol., 1821, 5*l.* 12s. 6d.; "Calliope, or English Harmony," with 2 vols. of G. and R. Cruikshank's "Universal Songster," 1828, 3*l.* 3s.; "Clio and Euterpe," a collection of songs and cantatas, 3 vols, 1762, 3*l.* 10s.; T. H. Ward's "English Art in the London Public Galleries," 15 parts, fol. 1888, 2*l.* 14s.; J. Forbes-Robertson's "Great Painters of Christendom, 4to., 10s.; J. Forster's "Life of Goldsmith," original edition, 1848, 12s.; C. Knight's "Gallery of Portraits," 7 vol., 1833-7, 2*l.*; Mrs. S. C. Hall's "Pilgrimages to English Shrines," illustrated by Fairholt, 2 vol., 10s.; J. Grego's "History of Elections and Electioneering in the Old Days," large paper, 4to, 1886. 13s.; and A. J. C. Hare's "Walks in London," 1878, with J. Timbs's "London and Westminster," 1868, 4 vols., 1*l.* 5s. In the same week Messrs. Puttick & Simpson disposed of a good collection of engravings in illustration of British topography, with some scarce early views of London and Westminster. The principal lots comprised:—F. Jukes's aquatint, after E. Dayes, by R. Pollard, of "Warren Hastings' Trial, 1789," 18s.; "Election of Members for Westminster, 1818," and "George IV.'s Coronation Procession," etched by G. Scharf, engraved by R. Havell, in colours, 2*l.* 2s.; Gosselin's "Promenade at Carlisle House" (Soho-square), in mezzo, 17s.; "Queen-square" (Holborn), and "Grosvenor-square," by R. Pollard, after E. Dayes, 2*l.* 7s.; "The Masons' Procession" (with view of Denmark [Somerset] House, Strand), on April 27, 1742, 13s.; Werner's "London and the Thames," 15s.; "Lord Lovat's Trial in Westminster Hall, 1747," by J. Freeman, 2*l.* 4s.; Alix's (old) "Westminster Bridge," showing the houses at either end, 10s.; W. Daniell's large coloured aquatints of the West India Docks, Isle of Dogs, 1800–2, and of the East India Docks, Blackwall, built by John Perry in 1803, 9s.; and two of the views, by R. Dodd, of the port of London, in mezzo, Greenwich, and Limehouse with one of the windmills upon the shore, 1793, 15s.; C. Bowles's "Peep into the Court of King's Bench," coloured, 1785, 12s.; and "Deptford Dockyard," with plan, engraved by Woollett, after R. Paton, 1775, 5s. The engraved copper plate, with the entire remaining stock of about 400 impressions, of J. S. Copley's painting (now in the National Collection) of the "Death of Major Pierson" (at St. Helier, in Jersey, on January 6, 1781, all the figures being portraits) was bought for 20*l.*

"L'AIR FROID" SYSTEM.—The patentee of this system, Mr. Inkpen, in reference to our comment on page 147 *ante*, writes to say that he makes no claim in his patent for any improvement in ventilating as such, but only for a system of distributing cold air over plate-glass window surfaces.

STREET HYGIENE.—At a recent meeting of the German Public Health Society, Dr. Theodor Weyl spoke on the street hygiene of Paris and London, and recommended the adoption in Berlin of many of the arrangements in vogue at those places. The gist of his remarks was as follows:—Wooden pavement has been in use in London and Paris for many years past, and has proved a great success, even in the most frequented streets. The fact that it has been less successful in Berlin may be due to faults of construction and treatment. In Paris and London there are no rails in streets paved with wood. The pavement is copiously watered. Drains and pipes are not laid under it, but under the side-walks. The main thing, however, is good construction. In London and Paris sweeping is always preceded by watering, which is not the case here, to the serious detriment of the public health. The public closets in Paris are not worthy of imitation, because hygienic considerations are to a large extent subordinated to advertising purposes, but those of London are exemplary. The depositing of rubbish within or even in the immediate vicinity of cities is altogether to be condemned. The removal of snow costs Berlin about 19,000*l.* a year, because it is not thrown into the river or sewers as in London and Paris, but carted out of the city. In conclusion, Dr. Weyl warmly recommended the London plan of regulating traffic by placing the lamp-posts in the middle of the street.—*Lancet.*

AMERICAN STANDARD FOR SEWER-PIPES.—Messrs. Blackmer & Post, of St. Louis, are large makers of vitrified sewer-pipes. Having been led to suppose that a change in dimensions of these articles would be advantageous, they took the step of sending out a circular to the city engineers, sewer commissioners, civil engineers, and others in the United States interested in sanitary matters, asking their opinions upon the subject. It was proposed to make the sewer-pipes in 2½-ft. lengths, instead of the usual 2-ft. lengths. Over 800 replies were received, and 95 per cent. of these were in favour of the change. This has led the firm to change its standard of length, and other makers, says *Engineering News*, from which journal we take these particulars, will doubtless follow to meet this well-expressed demand for longer sewer-pipes. T and Y junctions, however, are to remain 2 ft. long as before. Another change in the American sewer-pipe is the alteration of the socket, which was formerly 1¾ in. deep, and is now increased to 3 in.

A STRONG PAVING-BRICK.—Mr. W. N. Williams, in a letter to an American technical paper, gives particulars of tests made with a paving-brick, which would seem to possess very remarkable properties. The tests were made by the Mechanical Superintendent of the Union Pacific Railway shops at Omaha. The brick is known as the "Wade Paving-brick," and is the subject of a United States patent. One specimen, 7 square inches in area, was subjected to crushing stress of 28,000 lbs. to the square inch, and then gave way by simply cracking in two. A piece of Sioux Falls granite, 4 in. square, tested at the same time to afford a basis of comparison, crushed when subjected to 23,300 lbs. to the square inch. The brick is said to be made of fire-clay, but in this case, we are told, the great strength of the material is due to a peculiar earth found in the neighbourhood of Omaha. It is not stated how much of the "peculiar earth" is required, but, if the quantity is not excessive, one would think it would pay to import it and make these bricks in this country.

ELECTRICITY *v.* GAS IN BERLIN.—To what extent illumination by means of electricity is becoming popular in Berlin can be seen by the figures contained in the 1890-91 report of the municipal gas-works of that city. Instead of having had to supply the inhabitants with an extra five million cubic mètres of gas, as in the preceding year, only two and a-half million cubic mètres extra were required, and this in spite of an extraordinary increase in the number of new tenements and new streets. In the city proper the amount of gas required during the year 1890-91 was 7·9 per cent. less than the amount supplied in 1889-90.

NEW CLOCK, SCALBY PARISH CHURCH, NEAR SCARBOROUGH.—Scalby, so well known to visitors to Scarborough, has had an important addition to its old parish church in the shape of a public clock, with two large external dials, one facing eastward, over the body of the church, towards the village of Scalby, the other on the west, towards the residence of the donor, Mr. J. E. Ellis, M.P., Wrea Head, Scalby, and the schools and cottages adjoining. The clock strikes the hours upon the large or tenor bell. The work has been executed by Messrs. William Potts & Sons, Leeds.

BRUSSELS A SEAPORT.—An advance has been made with the scheme for making Brussels a seaport, as, according to official statements, the cost of enlarging the existing canal to the sea is estimated at 830,000*l.*, the cost of the harbour works and dry dock at Brussels at 500,000*l.*, and the enclosing of the river Sermette, at 83,000*l.* Negotiations are now in progress as to the division of the cost between the State and the provinces.

DEATH OF MR. THOMAS BEATY, CARLISLE.—We regret to announce the death, at the early age of forty-seven years, of Mr. Thomas Beaty, of the firm of Beaty Bros., builders, of Carlisle, which occurred on the 17th inst.

COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITION.

Nature of Work.	By whom Advertised.	Premium.	Designs to be delivered.
*Construction of Bridge over Canal.....	Corp. of Bootle	105*l.* and 52*l.* 10s.	June 1

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Works and Materials	Hendon Local Board..	S. S. Grimley	Feb. 29
*Supplying and Laying Victoria Stone and Kerbing	Farnham Local Board	R. F. Hankins	do.
Bridge, Warehouse, &c. Hebden Bridge ..	Isaac Longrigg.....	Utley & Gray	Mar. 1
Sewerage, &c. Works, Northwich	Salt Union, Lim.	.....	do.
House, Lazonby, Carlisle	Southend Loc. Bd.....	.....	do.
*Pipe Sewers, &c.	Lewisham Bd. of Wks.	P. Dodd.....	do.
*Works and Materials	St. Saviour's Board of Works	*Official*	do.
*Sweeping and Cleaning Streets	Royal Hospital, Chelsea	do.	Mar. 2
	Hardingstone High. B.	do.	do.
*Removing Concrete Bed, R.N.E.	Llanwonno School Bd.	do.	do.
Road Metal (10,000 tons).....	.....	A. O. Evans	do.
School Extension, Penrhiwceiber	Midland Railway	C. C. Doig.....	Mar. 3
Cottage, Glenlivet Distillery, Elgin, N.B.	Kent County Council	Harry Pyrah	Mar. 4
Two Houses and Shops, Lightcliffe, Leeds	Neath U.S.A.	*Official*	do.
*Erection of Institute, Derby	Trustees	do.	Mar. 5
*Maintenance and Repairs to Roads	St. Giles' Board of Works	do.	do.
Improvement Works	Richmond (Surrey) Town Council	John Wilson	do.
Sunday School and Premises, Runcorn ..	Romford Local Board	*Official*	do.
*Removal of Street Sweepings, &c.....	Sch. Bd. for London..	do.	Mar. 7
*Sewerage Works	Manchester Ship Canal Co.....	do.	do.
*Works and Materials	Borough of Croydon ..	do.	do.
*Purchase and Pulling-down Property	Rotherhithe Vestry ..	do.	do.
*Construction of Portion of Canal	Boro' of West Ham	do.	do.
*Repair of Private Roads.....	Battersea Vestry	C. Dunch	do.
*Works and Materials	West Ham Council ..	J. T. Pilditch	do.
*Wrought-iron Fencing	Colchester Town Coun.	Lewis Angell	do.
*Completing Stores, Dwelling-house, &c. ..	West Ham Union	*Official*	Mar. 8
*Works and Materials	Battersea Vestry	do.	do.
*Supplies, Collection of House Refuse, &c.	Chiswick L. B.	J. T. Pilditch	do.
*Supply of Materials.....	Aston Manor Loc. Bd.	A. Ramsden.....	do.
*Oak Fencing.....	Twickenham L. B.....	W. A. Davies	Mar. 9
*Brick Sewer, &c.	Hornsey Loc. Bd.	G. B. Laffan.....	do.
*Works and Materials	do.	T. de Courcy Meade ..	Mar. 10
*Widening, Deepening, &c. Hockley Brook		do.	do.
*Brick and Concrete, and Pipe Sewers, &c.			Mar. 11
*Making-up Roads			do.
*Sewerage Works			

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor or Engineer.	Tenders to be delivered.
*Two Cottages	Hornsey Loc. Bd.	T. de Courcy Meade ..	Mar. 11
*Works and Materials	do.	do.	do.
*Iron Fencing, with Gates	do.	do.	do.
*Supply of Materials	do.	do.	do.
*Wood Paving Blocks	St. Pancras Vestry ..	W. N. Blair	Mar. 14
*Works and Materials	Fulham Vestry	*Official*	Mar. 15
*Supply of Materials	Borough of St. Helens	do.	do.
*Works and Materials	Wimbledon Local Bd.	do.	do.
*Works and Materials	Tottenham Loc. Bd...	do.	do.
*Sewerage Works	Corp. of Durban, Natal	W. H. Radford	do.
School Building, Quaker's-yard, Glam. ..	South Wales and Monmouth Truants' Sch.	W. H. D. Caple	Mar. 16
Flags, Paving Stones, &c.	Carlisle Corporation..	W. H. Smith	do.
*Making Roads, &c. at Infirmary.....	St. Olave's Union	Newman & Newman	Mar. 17
*Fire Escape Staircases.....	do.	do	do.
*Cast-iron Mains, &c. for Water Supply ..	Shardlow Union.....	G. Hodson.....	Mar. 19
*Repairs, &c. to Chimney Shaft	Commrs. for P. B. & W. St. Giles, &c.	J. Waldram	Mar. 23
*Iron Staircases	London C. C. Asylum Committee.....	*Official*	Mar. 26
*Public Baths	Corp. of Coventry	do.	April 4
*Police Buildings	Guildford T. C.	W. G. Lower.....	No date
Residence, Bramley, Leeds	.....	E. P. Peterson.....	do.
House and Stabling, Pontefract	....	S. J. Holliday	do.
Pair of Villas, Lightcliffe, Leeds.....	.....	Rhodes Calvert	do.
Additions to Wedgwood Institute, Burslem	.....	Ford & Slater	do.
Iron Footway, Oundle.....	Northampton C. C. ..	*Official*	do.
Two Cottages, Siddal, Leeds.....	.....	Jackson & Fox	do.
Mountsorrell, &c. Granite	Towcester High. Bd..	R. W. Rolfe	do.
Branch Bank, Atherton, Warrington	Williams, Deacon, & Manchester & Salford Bank.....	Bradshaw & Gass	do.
Church, Millbrook, Cornwall	.....	G. H. F. Prynne.....	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Borough Surveyor.....	Bootle Corp	300*l.*	Mar. 3
*Clerk of Works	Camberwell Guar.....	4*l.* per week	do.
*Extra Assistant City Engineer	Cape Town Corp.	275*l.*	Mar. 5
*Assistant Engineering Surveyor.....	Birkenhead Corp.	120*l.* &c.	Mar. 8
*Sanitary Inspector	Hanley County Boro'	104*l.*.....	do.
*Surveyor and Inspector of Nuisances	Braintree Loc. Bd....	100*l.* &c.	Mar. 9
*District Surveyor	Everley and Pewsey Highway Board	160*l.*.....	Mar. 10
*Road Surveyor	Norfolk C. C.	2*l.* &c.	Mar. 12

Those marked with an Asterisk (*) are advertised in this Number. *Competition, p.* iv. ***Contracts, pp.*** iv., vi., viii., ix. & xxiii. ***Public Appointments, p.*** xx. & xxi.

THE ENGLISH IRON TRADE.—Consequent upon the break in Scotch warrants reported last week, the English iron market has been very irregular; in most districts depression is the prevailing characteristic. The present state of inaction in the Glasgow warrant market will, it is expected, continue for some time. Scotch warrants have been as low as 40s. cash and 39s. 10½d. one month fixed. The Cleveland market has been disorganised, but closes more cheerful and stronger. The hematite pig-iron trade remains dull. Manufactured iron is quieter. Tinplates continue unchanged. In the steel trade, rails are tolerably brisk, but other descriptions exhibit no alteration. Shipbuilding yards, except on the Tyne and Wear, are fairly well employed. Engineers and ironfounders are rather slacker. There appears a possibility of the strike on the Tyne approaching settlement. The coal trade is steady.—*Iron.*

A LARGE WIRE ROPE.—What is said to be the heaviest colliery wire-rope ever made in Sunderland has been produced by the Hendon Patent Ropery. It is six miles in length, and weighs twenty-four tons. It was carried through Sunderland on two heavy wagons drawn by twenty horses.

GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE.—On the 20th inst. the students of this College attending the honours and advanced stages in building construction visited the City Saw-mills, Port Dundas. Beginning at the log pond, they were conducted through the saw-mills, workshops, &c., finally through the creosoting work, at which a hearty vote of thanks was, on the motion of Mr. Gourlay, the lecturer, accorded Mr. Robb, manager, for his guidance, and the large amount of instruction he so kindly gave.

ELECTRICAL EXHIBITION IN MOSCOW.—It is officially announced that an international Electrical Exhibition will be held in Moscow between April 14 and October 14 next. The Exhibition will be divided into eight sections, Section VII embracing new apparatus in all branches of electrical science.

PORTRAIT BUST OF THE LATE MR. W. H. SMITH, M.P.—At a meeting of the Court of Common Council, held last week at the Guildhall, the model (in a competition of six) submitted by Mr. Joseph Whitehead, of Westminster, was selected to be executed in marble, the sum voted for its execution being 200 guineas. The successful competitor is a son of the senior member of Messrs. J. Whitehead & Sons, The Granite Works, Aberdeen.

THE FIRST TELEPHONE IN BULGARIA.—The first telephone in Bulgaria has just been opened between Sophia and Philippopolis, a distance of 160 kilomètres.

ARTISANS', LABOURERS', AND GENERAL DWELLINGS COMPANY.—The twenty-fifth annual report of this Company states that the principal work of the year has been the completing of the blocks of buildings at Rosoman-street; the pressing forward of the blocks at Skinners'-street and Crawford-street; and the elaboration of a detailed scheme for the development of the Leigham-court estate. The plans in connexion with Leigham-court have received careful consideration and study in order to meet the various requirements of the London County Council, and of the Local Authorities; and the assent of these Authorities has now been given to their proposals. A statement appended shows that between 1871 and 1891 the capital of the Company has increased from 18,580*l.* to 1,902,100*l.*

MEETINGS.

SATURDAY, FEBRUARY 27.

Builders' Foremen and Clerks of Works' Institution.—Annual Dinner, Holborn Restaurant. 6 p.m.

Edinburgh Architectural Association.—Visit to St. Nicholas Church, Dalkeith and to Newbattle Abbey.

MONDAY, FEBRUARY 29.

Surveyors' Institution.—Adjourned Discussion on Mr. J. W. Grover's paper entitled "An Explanation of the London Water Question." 8 p.m.

Society of Arts (Cantor Lectures).—Professor William Robinson on "The Uses of Petroleum in Prime Movers." I. 8 p.m.

Leeds and Yorkshire Architectural Society.—Mr. A. Beresford Pite on "The Architecture of Michael Angelo." 7.30.

TUESDAY, MARCH 1.

Institution of Civil Engineers.—Discussion on the following papers:—(1) "The Bishop Rock Lighthouses." by Mr. W. T. Douglass. (2) "The Illumination by Gas of Tory Island Lighthouse, Co. Donegal," by Mr. David C. Salmond. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Diseases of Animals in relation to Meat Supply; Characteristics of Vegetables, Fish, &c, Unfit for Food" 8 p.m.

Society of Biblical Archæology.—8 p.m.

Glasgow Architectural Association.—Annual Business Meeting. 8 p.m.

WEDNESDAY, MARCH 2.

Carpenters' Hall, London Wall.—Professor T Roger Smith on "Sanitary Construction of Public Buildings." 8 p.m. (*Admission free.*)

Royal Archæological Institute.—(1) Mr. A. Heneage Cocks on "Scandinavian Prim-Stav Calendars." (2) The Rev. Greville I. Chester on "Archaic Engravings on Rocks near Gebel Silsileh in Upper Egypt." 4 p.m.

British Archæological Association.—(1) Mr. E. P. Loftus Brock, F.S.A., on "Waddington Church, Lincoln" (2) Dr. F. R. Fairbank, F.S.A., on "Roman Pottery found at Doncaster." 8 p.m.

British Museum.—Miss Eugénie Sellers on "Greek Sculpture: Sculptures from Halikarnassos and from Temple of Priene." IV. 2.30 p.m.

Civil and Mechanical Engineers' Society.—Paper by Mr. R. J. Friswell, entitled "Some Practical Notes on the Water-supply of Boilers." 7 p.m.

Society of Arts.—Professor Vivian B. Lewes on "Spontaneous Ignition of Coal, and its Prevention." 8 p.m.

THURSDAY, MARCH 3.

Society of Arts (Indian Section).—Surgeon-General Sir William James Moore on "Indian Sanitation and the International Congress of Hygiene." 4.30 p.m.

Society of Antiquaries.—8.30 p.m.

FRIDAY, MARCH 4.

Architectural Association.—Mr. J. Alfred Gotch on "How they Built in Shakespeare's Time," with lantern illustrations. 7.30 p.m.

Royal Academy of Arts.—Professor J. H. Middleton on "Michael Angelo." II. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. Shirley F. Murphy on "Infectious Diseases and Methods of Disinfection." 8 p.m.

SATURDAY, MARCH 5.

Institution of Civil Engineers.—Students' visit to the Oil-gas Works of the Great Northern Railway at Holloway. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

1,767.—SASH-FASTENER: *J. Trick.*—This patent refers to what is described as an improved ventilating sash-fastener, whereby the window or sashes may be partially opened at top or bottom for ventilation, and may be fastened in that position from the inside, and so secured from burglars or from being shaken by the wind. It consists of a plate containing lock-holes attached to the upper sash, in combination with a cylinder mounted on the meeting-rail of the lower sash and carrying a spirally slotted pin, the point of which is designed to be placed in the above lock-holes.

2,791.—BRIDGE-FLOORING, &c.: *J. V. Boyd-Wilson.*—The object of this invention is to provide more ready and effective means for the formation of bridge-floors or decking, fire-resisting flooring, and similar constructions. For this purpose it is proposed to use a channel-beam or girder of a peculiar section as described, the section being an arch springing from the upper portions of two right angles facing each other inwardly. In combination with the above a special concrete of "Kieselguhr," alone or with Portland or other cement, in the formulæ described, is used.

3,070.—CISTERNS: *G. M. Lawford.*—This specification refers to an improved form of water-waste preventing cistern, dispensing with all unsightly external arms and levers, and producing an entirely self-contained ornamental cistern. A form of cistern is used with a slotted lug cast on each side, at the centre in which a spindle works. The spindle is held in place by a split pin at each end. The cover rests on a continuous external bead, and, when in place, conceals the lugs. On the spindle is fixed a lever, one end of which is attached to a syphon valve. The lever is worked by a chain passing through the cistern inside a tube held in place by two nuts.

4,565.—CHIMNEYS: *E. R. Salwey.*—This patent refers to an invention for the purification of smoke from chimneys specially applicable to dwelling and other houses. It may, however, be applied to the chimneys of factories and works of a similar character. The smoke passes through a lightly-packed mass of asbestos, talc, or other non-inflammable suitable substance, which retains the sooty particles. This mass is contained in a wire cage fitted with a door and inserted in the chimney through a side aperture, preferably near the top of the chimney. The cage and its contents, constituting a trap for the impurities in the smoke, are supported in place upon narrow shelves fixed in the masonry, and may be withdrawn for the purpose of removing the deposited impurities.

4,768.—UNDERGROUND CHANNELS: *G. Lawson.*—This specification destribes a method of excavating underground channels for building the walls of subways and other purposes by employing longitudinal moving shield

walls, composed of a series of longitudinal sections, built vertically, to slide horizontally forward over each other, as described and illustrated. There is also described the combination and use of a series of horizontal moving sectional cutting and earth-removing frames, and of sectional excavating side frames, working horizontally over each other.

NEW APPLICATIONS FOR LETTERS PATENTS.

February 8.—2,348, M. Syer, Disinfecting Apparatus for attachment to Flushing Cisterns, Pipes, &c.—2,349, M. Syer, Syphon Flushing Tank.—2,358, C. Baker, Safety Gates.—2,364, G. Thompson, Nails.—2,375, Sir A. Hickman, Refractory and Basic Bricks and Tuyeres.—2,385, M. Hallam Fasteners for the Cords of Window-Blinds.—2,392, W. and E. Freeman, Flushing Tanks or water waste Preventers.

February 9.—2,543, H. Sutcliffe, Water-closet Basins, and in Means of Ventilating the Soil-pipes of same.—2,547, H. Whiteley, Automatic Safety Apparatus for Opening and Closing the Doors of Hoists.—2,496, F. Phelps and H. O'Brien, Carpenters' Planes, also applicable to Levels.—2,547, H. Baxter, Windows.

February 10.—2,566, W. Andrews, Door-spring.—2,568, R. Kirlew, Chimney and Ventilating Shafts.—2,577, A. Milne, Double-action Bolts for Doors, French Windows, &c.—2,585, W. Mounsey, Flushing and Ventilating Apparatus for Water-closets.—2,602, W. Sterling and T. Swann, Sanitary and other Pipes and an Improved Method of Constructing Sewers and Drains.—2,614, W. Bly, Flushing Apparatus for Closets, &c.

February 11.—2,642, W. Shaddock, Protection of Wood, Granite, or other Pavement in Roadways and Tramways.—2,651, R. Somers, Fireplaces —2,683, W. Wardle, Ventilating-fans.—2,687, B. Faux, Stops or Checks for Doors, &c.—2,691, J. Green, Unions and Pipes for Drainage Purposes and Soil-pipes.—2,711, F. Humpherson, Automatic or Intermittent Syphon-flushing Apparatus.—2,713, T. McCulloch, Window Sash-fastener.—2,716, E. Parr, Screws.

February 13.—2,813, W. McKinlay, Automatic Sash-fastening and Lock.—2,814, J. Hullinghorst, Roofing Shingle.—2,872, H. Alexander, Chimney-tops to prevent Down-draughts, &c. — 2,894, J. Golding, Arches or Girders for Flooring.

PROVISIONAL SPECIFICATIONS ACCEPTED.

21,083, W. Whitehead, Recording and Checking Workmen's Time, and for other similar purposes.—22,310, E. Wright, Improved Inspection Eye or Plug for Sewer-pipes or Soil-pipes.—22,662, T. Anderson, Gasfittings.—8, G. Harrington, Cowl and Shaft Arrangements for Ventilation.—20, J. Bennett, Ventilation of Sewers and Drains.—28, J. Bolding, Construction of Water-closets for use in Railway Carriages, &c.—46, R. Yorke, Earthenware Pipes.—T. Hunt, Glazing of Earthenware Pipes, and analogous Articles.—379 G. Parkinson, Guarding Circular or other Saws.—591, W. White and H. Harry, Coverings for Walls, &c.—651, H Sayle, New Automatic Noiseless Flushing Valve for Water-closets and Urinals.—905, T. Lane and A. May, Chimney-tops or Cowls.—1,058, J. Schneider, Chimney Cowl.—1,101, H. Hansen and others, Hoods or Cowls for Ventilating or other Shafts.—1,323, A. Ransome, Machinery for Felling and Cutting Timber.—1,560, H. Lake, Wood-working Machinery.—1,561, R. Schram, Rock Drills.—1,577, J. Ottaway, Window-sashes.—1,821, R. Ardagh, Wooden Paving or Flooring Blocks.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

3,971, J. Piccaver, Fastener for Doors, &c.—6,041, J. Craven, Kilns for Drying and Burning Bricks or other articles or materials.—6,274, J. Lee, Window-fastener.—6,821, R Pye, Moistening, Heating, Cooling, and Ventilating Factories, and other Buildings. — 620, J. Shannon, Wood Graining Machines.—715, G. Couzens, Traps.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

FEBRUARY 16.—By *A. J. F. Gibbons*: 26, Tabley-rd., Tufnell-pk., u.t. 90 yrs., g.r. 7*l.*, r. 40*l.*, 37.*l*.—By *Stokes & Pinder*: 20, Dorset-st., Portman-sq., u.t. 22 yrs., g.r. 40*l.*, 420*l.*

FEBRUARY 17.—By *Brodie, Timbs, & Baker*: 67 and 69, Nightingale-rd., Wood-green, f., 260*l.*

FEBRUARY 18.—By *Nokes & Nokes*: 77, 79, and 81, Bride-st., Islington, f., r. 122*l.*, 1,610*l.*; 10, Westbourne-rd., Barnsbury, and house adjoining, f., r. 89*l.*, 1,195*l.*; 105 and 107, Benwell-rd., Holloway, u.t. 42 yrs., g.r. 12*l.*, 350*l.*—By *D. Watney & Sons*: F.g.r. of 500*l.*, with reversion in 41 yrs., Cannon-st., E.C., 13,250*l.*; 1 to 6, Stafford-cottages, Beddington, f., 850*l.*—By *Messrs. Trollope*: No. 18, St. James's-sq., u.t. 52 yrs., g.r. 100*l.*, r. 1,270*l.*, 10,000*l.*—By *H. J. Bliss & Sons*: F.g.r. of 20*l.*, with reversion in 18yrs., Ellwood-st., &c., Islington, 630*l.*; 222, Green-st., Bethnal Green, f.r. 30*l.*, 415*l.*; 73, Moss-st., f., r. 28*l.* 12s., 280*l.*; 185, Green-st., f., r. 32*l.*, 650*l.*; 10A, Hersee-pl., f., 250*l.*—By *Gilders Bros.*: 110, Murray-st., Hoxton, u.t. 50 yrs., g.r. 4*l.* 4s., r. 55*l.*, 535*l.*; 66 and 67, Ashburton-grove, Holloway, u.t. [48 yrs., g.r. 8*l.* 8s., r. 56*l.*, 460*l.*; 43, Exmouth-st., Clerkenwell, u.t. 24 yrs., g.r. 7*l.*, 380*l.*; 97, Rosoman-st., u.t. 24 yrs., g.r. 8*l.* 10s., r. 38*l.*, 240*l.*; "The Two Brewers," Warner-st., f.r. 32*l.*, 610*l.*; 4, 24, 26, and 30, Great Bath-st., 4 and 5, Bath-ct., and 43, Warner-st., u.t. 14 yrs., g.r. 190*l.*, r. 436*l.*, 200*l.*; 28 and 29, Great Bath-st., u.t. 14 yrs., g.r. 80*l.*, r. 206*l.*, 150*l.*; 11, Albemarle-st., u.t. 66 yrs., g.r. 26*l.*, r. 100*l.*, 800*l.*; 89, Battersea Pk.-rd., and 2, Savonia-pl., Battersea, u.t. 52 yrs., g.r. 17*l.*, r. 66*l.* 10s., 330*l.*; 1 to 7, Bartholomew-sq., St. Luke's, u.t. 6 yrs., g.r. 175*l.*, r. 321*l.*, 65*l.*; 7, King-st., u.t. 12¾ yrs., g.r. 24*l.*, 35*l.*; 22 and 23, King-st., u.t. 14 yrs., g.r. 48*l.*, 35*l.*; 70 and 72, Mildmay-grove, Mildmay Pk., u.t. 64 yrs., g.r. 14*l.*, r. 80*l.*, 675*l.*; 8 and 10, Lamont-rd., Chelsea, u.t. 53 yrs., g.r. 28*l.*, r. 95*l.* 18s., 790*l.*

FEBRUARY 19.—By *Ventom, Bull, & Cooper*: 22 and 24, Flodden-rd., Camberwell, u.t. 87 yrs., g.r. 24*l.*, 1,500*l.* By *Wells & Read*: 32, Defoe-rd., Stoke Newington, u.t. 73 yrs., g.r. 6*l.*, r. 28*l.*, 225*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	9/0.0	0/0/0
Teak, E.I... load	9/10/0	15/0/0
Sequoia, U.S.ft.cu.	2/3	3/0
Ash, Canada load	2/10/0	4/0/0
Birch, do.	3/5/0	4/10/0
Elm, do.	3/10/0	4/15/0
Fir, Dantzic, &c.	2/0/0	3/10/0
Oak, do.	3/0/0	5/0/0
Canada.....	5/0/0	7/0/0
Pine, Canada red	2/10/0	3/10/0
Do, yellow	2/10/0	5/0/0
Lath, D'ntzic, fath	5/5/0	6/10/0
St. Petersburg	5/10/0	7/10/0
Deals, Finland, 2nd & 1st std 100	8/10/0	10/10/0
Do, 4th & 3rd..	7/10/0	8/10/0
Do. Riga	6/10/0	8/0/0
St. Petersburg, 1st yellow ..	11/0/0	15/0/0
Do. 2nd yellow	8/10/0	10/10/0
Do. white	7/10/0	10/10/0
Swedish	7/15/0	16/0/0
White Sea	8/10/0	18/0/0
Canada, Pine 1st	20/0/0	26/0/0
Do. do. 2nd....	14/10/0	16/10/0
Do. do. 3rd, &c.	8 5/0	10/10/0
Do. Spruce. 1st	8/10/0	11/0/0
Do. do. 3rd & 2nd.....	6/15/6	8/0/0
New Brunswick	7/0/0	7/10/0
Battens, all kinds	3/10.0	15/10/0
Flooring Boards, sq., 1 in. prep. 1st	0'8/6	0/14/6
Do. 2nd.....	0/7/6	0/11/6
Other qualities	0'5/0	0/8/0
Cedar, Cuba ..ft.	/3½	/4½
Honduras, &c.	/2½	/4
Mahogany, Cuba.	/4½	/6½
St. Domingo, cargo av	/4½	2'0
Mexican do. do	/4	/5
Tobasco do. do	/5¼	/7
Honduras do..	/5½	/6½
Box, Turkey ton	4/0/0	15/0/0
Rose, Rio.....	10/0/0	30/0/0
Bahia	9/0.0	18/0/0
Satin, St. Domingo ....ft.	0.0 8	0/1/3

TIMBER (*continued*).		
Satin, Porto Rico	0/0/8	0/1/8
Walnut, Italian..	0/0/3½	0/0/7
METALS.		
IRON—Pig, in Scotland .....ton	2/0/6	2/0/7½
Bar, Welsh, in London.....	6/0/0	6/10.0
Do. do. at works in Wales	5/10.0	6/0.0
Do. Staffordshire, in London	6/5/0	6/15/0
COPPER—British, cake and ingot	47/0.0	47/10/0
Best selected ..	48/0/0	49/0/0
Sheets, strong..	57/0.0	58/0/0
Chili, bars	43/12/6	43/15/0
YELLOW METAL lb.	0.0/5½	0/0/5¾
LEAD—Pig, Spanish ....ton	10/17/6	11/0/0
English, com. brands	11/0/0	11/5/0
Sheet, English, 3 lbs. per sq. ft. and upwards ..	13.0.0	0/0/0
Pipe	13/10/0	0/0/0
ZINC—English sheet .....ton	25/5.0	0/0/0
Vieille Montague.....	25/15.0	0/0/0
TIN—Straits	89/7/6	89/10/0
Australian	84/10/0	84/15/0
English Ingots	92/10/0	92/15/0
OILS.		
Linseed .....ton	18/17/6	0/0/0
Cocoanut, Cochin	25/15/0	26/0/0
Do. Ceylon	23/0/0	0/0/0
Palm, Lagos	23/0/0	0/0/0
Rapeseed, English pale	26.5/0	0/0/0
Do. brown	24/10/0	0/0/0
Cottonseed refd...	17/15/0	18/0.0
Oleine	0/0/0	0/0/0
Lubricating, U.S.	4/10/0	5/10/0
Do. refined	5/0.0	10/0/0
TAR—Stockholm barrel	0/19/0	1/0/0
Archangel	0'12/6	0/0/0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

BEXHILL-ON-SEA.—For the erection of new premises for Lloyd's Bank, Limited. Mr. Arthur Wells, architect, Hastings:—

S. Barker	£3,472	P. Jenkins, St. Leonards*	£3,075
C. Thomas	3,289		

* Accepted.

BROMLEY (Kent).—For kerbing, paving, &c., in High-street, for the Bromley Local Board. Mr. Hugh S. Cregeen, Surveyor:—

T. Lansbury.....	£311 16 0	W. H. Wheeler	£416 6 1
E Peill & Sons	507 5 4	Woodham & Fry	411 18 6
B. Glenny	434 12 6	John Mowlem & Co.*	371 10 2

* Accepted.

BROXBOURNE.—Accepted for residence at Broxbourne, for Mr. J. Kirkaldy. Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge:—

J. A. Hunt £4,000 0 0

[No competition.]

CANNING TOWN (Essex).—For the erection of Public Hall, Canning Town, West Ham. Mr. Lewis Angell, Borough Engineer, architect:—

Reed, Blight, & Co.	£20,941	J. F. Coxhead	£19,299
J. Robson.....	19,985	Perry & Co.....	19,159
W. Gregar	19,930	Allen & Sons	18,825
J. Holland	19,860	Kirk & Randall.....	18,718
W. J. Maddison.....	19,850	A. Kellett, Willesden* ..	17,984

* Accepted.

CRANFORD.—For alterations to dwelling-house at the Park Farm, for the Right Honourable Lord Fitzhardinge. Mr. B. H. Ransford, surveyor:—

Simmonds.....	£690	Briant.....	£570
A. Martin	665	Hanson	565
Gibson	600	Brown	520
G. H. Martin & Co.	579	Foord & Son.....	499

CROYDON.—For the erection of union offices, board-room, and out-relief station, for the Guardians of the Croydon Union. Mr. Frederick West, architect, Croydon. Quantities by Mr. R. Peters, 72, Wool-exchange, E.C.:—

D. W. Barker	£7,939	Akers & Co.	£7,140
A. H. Howe	7,947	Smith & Sons	7,079
Lorden & Son	7,900	P. Peters	6,950
W. Smith	7,800	J. O. Richardson	6,758
Bryan & Son.....	7,523	M. Taylor	6,700
E. J. Saunders.....	7,440	Martin & Co.	6,683
T. W. Jones	7,400	A. Bullock, Croydon*	6,193
Bulled & Co.....	7,277		

* Accepted.

FOOTSCRAY.—For pulling down and re-building grocer's shop, after fire. Mr. J. Drake, architect, Rochester:—

Otway	£822 0	Multon & Wallis, Graves-end*	£749 0
Knight	767 10		
Brightling	754 0		

* Accepted subject to modifications.

FOOTSCRAY.—For building new show-rooms for Mr. Clarke, coachbuilder. Mr. J. Drake, architect, Rochester:—

Otway	£297	Multon & Wallis, Graves-end*	£199
Knight	255		
Brightling	235		

* Accepted.

HARROGATE.—Accepted for alterations and additions to Craven Lodge, Harrogate, for Mr. Cooper Eddison. Mr. T. Butler Wilson, architect, Central-chambers, Harrogate:—

Mason—Isaac Dickinson, Harrogate.....	£176 0 0
Joiner—Wm. Wilcock, Harrogate.....	72 10 0
Plumber—Geo. Lazenby, Leeds	34 0 0
Plasterer—Chas. Fortune, Harrogate	48 7 1
Slater—Joseph Shepherd, Harrogate	19 17 3
Decorator—George Dent, Harrogate	61 0 0

HARROW (Middlesex).—For works required to be done in erecting and completely finishing a house in Maxwell-road, Northwood, near Harrow, Middlesex, for Mr. J. C. Wilbee. Mr. W. Gilbee Scott and Mr. George F. M. Scott, architects, 25, Bedford-row, W.C.:—

	House.	Drainage.	Time.
Faulkner	£3,800 0 0	£109 0 0	..
Molly	3,380 0 0 ...	140 0 0 ...	..
Hearn & Elgood.	3,213 0 0	85 0 0	6 months.
Lee & Co.	3 200 0 0	110 0 0	8 ,,
Lawrence & Son.	3,150 0 0	95 0 0	6 ,,
W. Johnson	3,096 0 0	86 0 0	10 ,,
Godfrey & Son ..	3,035 0 0	78 0 0	7 ,,
Harris & Wardrop	3,023 0 0	76 0 0	7 ,,
Creaton & Co. ..	2,998 0 0	75 0 0	7 ,,
Jones & Co.	2,875 0 0	78 10 0	6 ,,
Turk & Appleton	2,815 0 0	76 0 0	9 ,,
Krench & Co. ..	2,530 0 0	68 0 0	7 ,,

HEADINGLEY (Yorks).—Accepted for additions to Whinfield, Headingley, for Mr. Arthur F. L. Hepton. Mr. T. Butler Wilson, architect, 12, East-parade, Leeds:—

Mason—Matthew Wilson, Headingley.....	£510 0 0
Joiner—J. Ranson Firth, Leeds	270 0 0
Slaters—J. Atkinson & Son, Leeds.....	13 14 0
Plumber—Thos. Sthwy, Leeds	99 10 0
Plasterer—R. Branton, Leeds	41 9 0

HORFIELD (near Bristol).—For laying sewer at Ashley Down, Horfield, near Bristol. Mr. A. P. I. Cotterell, Surveyor, Bristol:—

G. Heard	£299 8 6	Wm. Rogers*	£178 5 5
W. Mereweather.....	288 0 0		

* Accepted.

[Surveyor's estimate, £287. 1s. 6d.]

LEEDS.—Accepted for the erection of six terrace-houses, Cross-green, Otley, for Mr. W. E. Turner. Mr. Alfred Marshall, architect, Bank-chambers, Otley, Leeds:—

Masons' Work.—Fred. Cawood, Otley	£1,124 0 0
Joiners' Work.—Peter Patrick, Otley.....	560 0 0
Plasterers' Work.—John Laycock, Otley	140 0 0
Plumbers' Work.—Jas. Suttle & Son, Otley	115 0 0
Slaters' Work.—John Baynes, Ripon	86 0 0
Total	£2,025 0 0

LONDON.—For the erection of a palm-house in Battersea Park, for the London County Council. Mr. Thomas Blashill, Architect:—

W. H. Lascelles & Co., £3,995 and £3,170.
Clarke & Co., £3,675 and £2,799.
M. Marsland, £3,617 and £2,9c5.
G. Munday & Son, £3,417, less £211 if own system of glazing adopted, and £2,680, less £139 if own system of glazing adopted.
W. Parham, £3,317, less £500 if own system of glazing adopted, and £2,358, less £400 if own system of glazing adopted.
E. Coles & Son, £3,255 and £2,345.

[Referred to Parks and Open Spaces Committee.]

LONDON.—For the erection of public conveniences on Parliament-hill Hampstead, for the London County Council. Mr. Thomas Blashill, Architect:—

Heatley & Annan	£911 10	A. Wallis	£767 0
J. Garrett & Son	800 0	Jackson Bros.	688 0
Peattie & Axtell.....	738 0	H. Fowler	675 10
W. Wells.....	720 0		

[Referred to the Parks and Open Spaces Committee.]

LONDON.—For the supply of 20,000 tons of lime, for the London County Council (Main Drainage Department). Mr. A. R. Binnie, Engineer:—C. Christopherson & Co., 5,000 tons at 13s. 6d. per ton, 5,000 at 14s. 2d., and 2,000 at 16s. 6d.; Young & Son, 2,000 tons at 16s. per ton; W. Lee, Son, & Co., 20,000 tons at 16s. 6d. per ton; T. Rosher & Co., 5,000 tons (grey lime) at 17s. 3d. per ton; Hall & Co., 10,000 tons at 17s. 5d. per ton, 3 000 tons at 17s. 7d., 7.000 tons at 18s. 5d., 5,000 tons at 19s. 6d., and 5,000 tons at 20s. 3d.; P. Champion, 10,000 or 20,000 tons at 18s. per ton; Buxton Lime Firms Co., Limited, 20,000 tons at 18s. 6d. per ton; J. S. Peters, 5,000 tons at 19s. 6d. per ton; Hilton, Anderson, & Co., 13,000 tons at 19s. 6d. per ton; Formby's Cement Works Co., Limited, 5,000 tons at 19s. 10d. per ton; and the Minerva Lime Company, 20,000 tons at 22s. per ton.

[Referred to the Main Drainage Committee.]

LONDON.—For alterations and additions to the Western Ambulance Station, Seagrave-road, for the Managers of the Metropolitan Asylums Board. Messrs. A. & C. Harston, architects, 15, Leadenhall-street. Quantities by Mr. W. T. Farthing, 46, Strand:—

Courtney & Fairbairn	£4,900 0 0	A. Kellett	£4,022 15 10
J. J. Richards	4,398 0 0	C. Miskin.....	3,987 0 0
J. & M. Patrick.....	4 384 0 0	B. E. Nightingale..	3,9'0 0 0
Johnson & Co., Ltd.	4,250 0 0	Leslie & Co.....	3,750 0 0
W. Wells.....	4,200 0 0	F. G. Minter*.....	3,480 0 0

* Accepted.

LONDON.—For fitting-up hot-water supply apparatus in Blocks D, E, and F of the new workhouse, Pancras-road, for the Guardians of the Parish of St. Pancras. Messrs. A. & C. Harston, architects, 15, Leadenhall-street:—

C. P. Kinnell	£590 0	J. & F. May	£545 0
J. Fraser & Son.....	572 10	Wenham & Waters, Paragon Works, Croydon*..	455 0
Clements, Jeakes, & Co...	563 0		

* Accepted.

LONDON.—For providing and fixing heating apparatus on the low pressure hot-water system, for the Deaf and Dumb School now in course of erection on the Hugh Myddelton site, Clerkenwell, for the School Board for London. Mr. T. J. Bailey, Architect:—

Rosser & Russell, Ltd..	£233 10 0	T. Fraser & Son	£193 17 9
J. & F. May	230 0 0	T. Wontner Smith, Gray, & Co	188 0 0
G. Davis	229 10 0	Purcell & Nobbs*	164 0 0
W. G. Cannon	210 0 0		

* Accepted.

LONDON.—For providing and fixing heating apparatus on the low-pressure hot-water system, at the school now in course of erection in Glyn-road, Homerton, for the School Board for London. Mr. T. J. Bailey, Architect:—

J. & F. May.....	£465 0	Comyn, Ching, & Co.....	£448 10
J. Fraser & Son.....	463 15	J. Smeaton, Son, & Co., 56, Gt. Queen-st., W.C.*	364 0
G. Davis	450 0		

* Accepted by the Works Committee.

LONDON.—For providing and fixing heating apparatus on the low-pressure hot-water system, at the school now in course of erection in Ancona-road, Plumstead, for the School Board for London. Mr. T. J. Bailey, Architect:—

Rosser & Russell, Lim.	£591 0	T. Potter & Sons	£418 0
W. G. Cannon	535 0	J. Smeaton, Son, & Co., 56, Great Queen-street, W.C.*	369 0
Purcell & Nobbs	457 0		
R. Crane	455 0		
J. Wontner Smith, Gray, & Co.....	447 5		

* Accepted by the Works Committee.

LONDON.—For providing and fixing heating apparatus on the low-pressure hot-water system, at the school now in course of erection in Childeric-road, New Cross, for the School Board for London. Mr. T. J. Bailey, Architect:—

Wenham & Waters, Limited	£470 0	J. Wontner Smith, Gray, & Co.....	£396 0
J. & F. May.....	445 0	Russell & Co.....	384 0
J. Fraser & Son	440 15	R. Crane, 6, Binfield-road, Clapham*	382 0
T. Potter & Sons	398 0		
Purcell & Nobbs	396 0		

* Accepted by the Works Committee.

LONDON.—For providing and fixing heating apparatus on the low-pressure hot-water system, at the school now in course of erection in Munster-lane, Fulham, for the School Board for London. Mr. T. J. Bailey, Architect:—

Rosser & Russell, Limited	£549 0 0	R Crane	£476 0 0
W. G. Cannon.....	515 0 0	J. Fraser & Son	454 17 6
Wenham & Waters, Limited.....	510 0 0	J. Wontner Smith, Gray, & Co., 81, Finsbury-pavement*	450 0 0
Russell & Co.	488 0 0	Jones & Attwood	449 0 0

* Accepted by the Works Committee.

LONDON.—For providing and fixing heating apparatus on the low-pressure hot-water system, for the new school now in course of erection in Lillie-road, Fulham, for the School Board for London. Mr. T. J. Bailey, Architect:—

W. G. Cannon	£515	Purcell & Nobbs, 87 and 89, Cleveland-street, Fitzroy-square*	£482
Wenham & Waters, Limited	510		
G. Davis.....	496		

* Accepted by the Works Committee.

LONDON.—For new public library, Lambeth. Messrs. E. H. Burnell and J. E. Trollope, architects. Quantities by Mr. Charles H. Goode:—

Brass & Son	£7,384	Peto Bros.	£6,887
Castle Bros.	7,383	Holloway Bros.	6,850
Caudler & Son	7,320	Holliday & Greenwood	6,777
F. & H. F. Higgs.....	7,270	Nightingale	6,648
Hall, Beddall, & Co.	7,200	Perry & Co.	6,497
Higgs & Hill	7,180	Jerrard	6,363
Chappell.....	7,066		

LONDON.—For new bar fittings and alterations to "The Royal" public-house, Holborn. Mr. Hy. Ward, architect:—

Foster	£1,473	Taylor Bros.....	£1,198
W. H. Lascelles & Co.	1,247	Drew & Cadman	1,198
Nightingale	1,235	Lester & Co.	1,180
Gregory	1,220		

LONDON.—For fitting up shop, No. 446, Holloway-road, for Messrs. Rabbits & Sons, Limited. Mr. A. G. Hennell, architect:—

Mark	£1,031	Kearley	£830
Holloway Bros.	860	Lascelles & Co.	827
Johnson	843	Burman	810

LONDON.—For fitting shop at Seven Sisters'-road, for the United Kingdom Tea Co. Mr. A. G. Hennell, architect:—

Mark	£1,070	Burman & Son	£797
Holloway Bros.	885	Lascelles & Co.	759
Johnson	864	Kearley	718

LONDON.—For alterations to the "Prince of Wales" public-house, Fulham. Messrs. Bird & Walters, architects:—

Mark	£1,980	Goodall	1,889
Burman	1,960	Todd	1,846
Williams & Son	1,947	W. H. Lascelles & Co.	1,759
Gould & Brand	1,924		

LONDON.—For new premises in Stephen-street, Lisson-grove. Mr. F. W. Hunt, architect:—

Bywaters	£2,792	Lathey Bros.	£2,650
Holloway Bros.	2,762	W. Johnson & Co.	2,598
Pearce	2,698	Charteris	2,595

LONDON.—For new premises in Charles-street, Lisson-grove. Mr. F. W. Hunt, architect:—

Holloway Bros.	£2,928	Pearce	£2,832
Bywaters	2,922	Lathey Bros.	2,797
Charteris	2,865	W. Johnson & Co.	2,780

LONDON.—For the construction of three sewers and roads on the Cotton Estate, Fulham. Messrs. P. D. Tuckett & Co., surveyors, 2, Basinghall-street, E.C.:—

Wilson	£1,575	Mears	£1,495
Nowell & Robson	1,549	Killingback & Co.	1,481
R. Ballard	1,520	Rogers*	1,450
W. H. Watts	1,519	* Accepted.	

LONDON.—For erecting lodge cottage on Dartford Heath, for Mr. Gibson. Mr. W. Leonard Grant, architect:—

Brightling	£375	Butler	£327
H. Thomas	357		

LONDON.—Accepted for the erection of residence in Lyford-road, Wandsworth Common, for Mrs. Arthur Dicksee. Mr. Bernard Dicksee, architect:—

Frank Kirk £1,550 0 0

LONDON.—For works at the "Prince of Wales," St. James's-road, N. Messrs. Bird & Walters, architects, 64, Seymour-place, Bryanston-square, W.:—

Burman	£1,626 0	Evans	£1,483 15
Marks	1,573 0	Lascelles	1,483 0
Todd	1,529 0	Edwards & Medway, Kennington*	1,451 0
Goodall	1,488 0	* Accepted.	

LONDON.—Accepted for work at the "Queen's Arms," Spa-road, Bermondsey. Mr. J. Brooker, architect, 13, Railway Approach, London Bridge:—

Edwards & Medway, Kennington £489 0 0

LONDON.—Accepted for the restoration of the tower and spire of St. Giles's Church, Camberwell. Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge:—

Colls & Son, Camberwell £3,500 0 0

[No competition.]

LONDON.—Accepted for building stables in Long-lane, Bermondsey, for Mr Samuel Taylor. Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge:—

W. & H. Castle £3,700 0 0

[No competition.]

LONDON.—Accepted for work at "The Union," King's Cross-road. Mr. J. Brooker, architect, 13, Railway Approach, London Bridge:—

Edwards & Medway, Kennington £674 0 0

ST. LEONARDS-ON-SEA.—For alterations, repairs, and new bar front at the "Prince of Wales" Hotel, for Messrs. Ballard & Co. Mr. Arthur Wells, architect, Hastings:—

W. F. Vidler	£334 12 9	S. Smith, St. Leonards*	£254 11 6
T. Salter	305 0 0	* Accepted.	

SOUTHSEA.—For the erection of business premises in Palmerston-road, Southsea, for Messrs. W. & H. Stevenson. Mr. George Judge, architect, London. Quantities by Mr. Chas. W. Bevis:—

W. R. & C. Light	£3,033 0 0	Scammell & Dowdell	£2,610 0 0
J. Crockerell	2,846 9 6	E. & A. Sprigings*	2,510 0 0
H. Jones	2,778 0 0	* Accepted.	

[All of Portsmouth and Southsea.]

TO CORRESPONDENTS.

G. M. M. (There are unfortunately a good many instances of this kind of procedure now, but it is mostly only the resort of obscure members of the profession).—"General Foreman" (no name or address enclosed).—J. H. P.—G. B. C. (shall have attention).—S. W. (should have sent amounts).—J. F. W. (ditto).—C. J. K. (too late).

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1892.

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Pursuant to the Act of Parliament, 22nd and 23rd Victoria Cap. 35, intituled "An Act to further amend the law of Property, and to relieve Trustees," Notice is hereby given that all CREDITORS and other Persons having any CLAIMS or DEMANDS against the Estate of DAVID OGILVY BOYD, late of No. 19, Maddox-street, Regent-street, London, who died on the 26th day of January, 1892, intestate, and to whose estate letters of Administration were granted by Her Majesty's High Court of Justice, at the principal Probate Registry thereof, to MATILDA MARY BOYD, the lawful widow and relict of the said Intestate, are hereby required to send particulars in writing of their CLAIMS or DEMANDS to the said MARY MATILDA BOYD, at No. 19, Maddox-street, aforesaid, on or before the 25th day of MARCH next, after which date the said Administratrix will proceed to distribute the assets of the said deceased amongst the persons entitled thereto, having regard only to the Claims and Demands of which she shall then have had notice, and she will not be liable for the assets of the said deceased, or any part thereof so distributed, to any person or persons of whose Claims or Demands she shall not then have had notice.

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EVERLEY AND PEWSEY HIGHWAY BOARD.
APPOINTMENT OF DISTRICT SURVEYOR.

The Waywardens of this Board will at their Meeting, to be held on March 21 next, at TWELVE o'clock, proceed to the ELECTION of a DISTRICT SURVEYOR at a salary of 160*l.* a year.

The person appointed must be competent to perform all the duties of the office of a District Surveyor, and will be required to devote his whole time to the duties of the office, and be restricted from carrying on any business or from holding any other appointment, and he will be also required to reside in the district and in or near Pewsey.

No person will be appointed above the age of 45 years.

Applications (accompanied by Testimonials) to be sent to me on or before the 10th MARCH next.

S. B. DIXON,
Clerk to the Board.

Pewsey, Wilts,
February 22nd, 1892

COUNTY BOROUGH of HANLEY.
WANTED, an additional SANITARY INSPECTOR, whose principal duties will be the carrying out of the provisions of the Factories and Workshops Acts and Smoke Inspection. Salary, 104*l.* a year.

No applicant will be eligible who does not possess the certificate of the Sanitary Institute of Great Britain.

Applications in the handwriting of the candidates, giving full particulars as to age, qualifications, and previous experience, accompanied by not more than three testimonials of recent date, must be sent to me on or before TUESDAY, 8th MARCH, 1892, marked "Sanitary Inspectorship."

Canvassing either directly or indirectly will disqualify.

ARTHUR CHALLINOR,
Town Clerk.

Town Clerk's Office,
Town Hall, Hanley.

BOROUGH of BOOTLE.
APPOINTMENT OF BOROUGH SURVEYOR.

The Corporation of Bootle are prepared to receive APPLICATIONS from competent and experienced persons for the APPOINTMENT of BOROUGH SURVEYOR.

Salary, 300*l.* per annum, clear of all office expenses and disbursements.

Further particulars, together with a schedule of duties, may be obtained on application at this Office.

Canvassing members of the Council is prohibited.

Applications (accompanied by copies of not more than five recent testimonials), endorsed "Borough Surveyor," to be addressed to the Mayor and delivered at this Office not later than 3rd MARCH next.

By Order
J. H. FARMER
Town Clerk.

Town Clerk's Office, Bootle,
February 18th, 1892.

BOROUGH OF BIRKENHEAD.
ASSISTANT ENGINEERING SURVEYOR AND DRAUGHTSMAN.

The Corporation of Birkenhead require the SERVICES of an ASSISTANT ENGINEERING SURVEYOR and DRAUGHTSMAN in the Borough Surveyor's Department, at a commencing salary of 120*l.* per annum, increasing on satisfactory service by annual increments of 10*l.* to a maximum of 150*l.* per annum.

Applicants must be good Draughtsmen, and have a thorough practical knowledge of surveying, levelling, and the preparation of plans, sections, and specifications, and the taking out of quantities for the construction of sewers, roads, drains and passages, and footway flagging.

Applicants must also be competent to measure up works, prepare draft apportionments, and the person appointed will be required to assist generally under the direction of the Borough Surveyor.

A person having had experience in the Office of a Borough Surveyor will have preference.

Applications, in candidates' own handwriting, stating age, experience, and present employment, with copies of not more than three recent testimonials, sealed, and endorsed "Assistant Engineering Surveyor and Draughtsman," must be sent in to me not later than TWELVE o'clock at noon on TUESDAY, the 8th day of MARCH, 1892.

Canvassing members of the Council either directly or indirectly will be deemed a disqualification.

By order,
ALFRED GILL,
Town Clerk.

Town Hall, Birkenhead,
February 18th, 1892.

TO SURVEYORS and OTHERS.

The Braintree Local Board of Health REQUIRE the services of a practical man as SURVEYOR and INSPECTOR OF NUISANCES. He will be required to take the superintendence of the sewage, irrigation, and water works, and the engines and machinery connected therewith, and the repair of about ten miles of road. He must have a practical knowledge of engineering, and must be competent to take levels and to superintend the laying of drains, watermains, and sewers. He will be required to devote his whole time to the service of the Board.

Salary 100*l.* per annum, with house, coals, gas, and water free.

Braintree contains about 5,000 inhabitants.

Applications, stating age, &c. and enclosing testimonials, must reach us not later than SEVEN o'clock in the evening of the 9th day of MARCH, 1892.

A. & H. J. CUNNINGTON,
Clerks to the Board, Braintree.

Braintree, February 23, 1892.

CAPE TOWN, SOUTH AFRICA.
EXTRA ASSISTANT CITY ENGINEER.

The Corporation of the City of Cape Town intend to appoint an EXTRA ASSISTANT CITY ENGINEER, whose age is not to exceed thirty-five years, and who will be required to reside within the district, and to devote the whole of his time to the duties of his office

Salary 275*l.* per annum.

Applications, with COPIES ONLY of testimonials, endorsed "Assistant City Engineer," to be forwarded to the undersigned on or before the 5th MARCH, from whom particulars of the duties and terms of appointment can be obtained.

By order of the Cape Town Corporation,
DAVIS & SOPER, London Agents.
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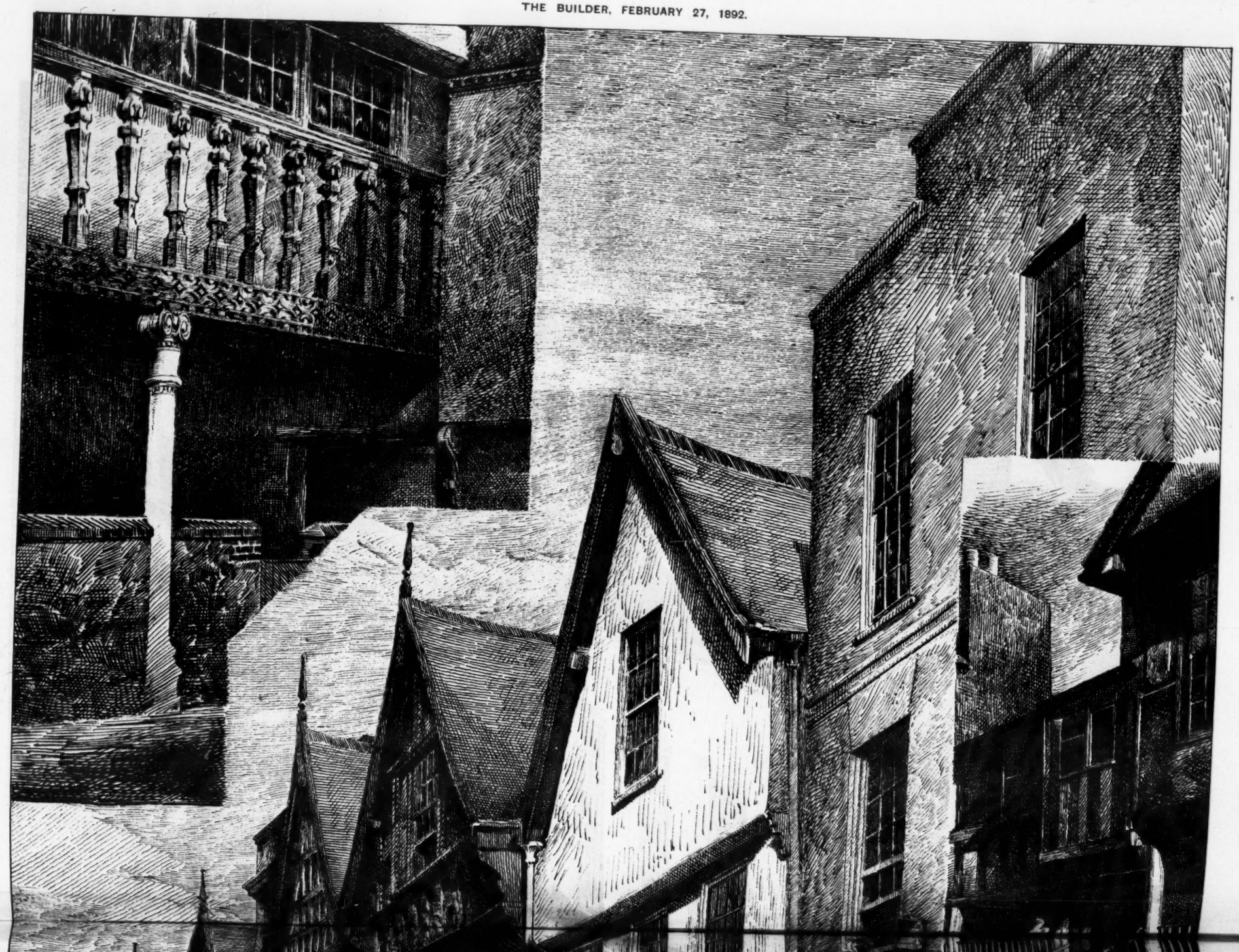

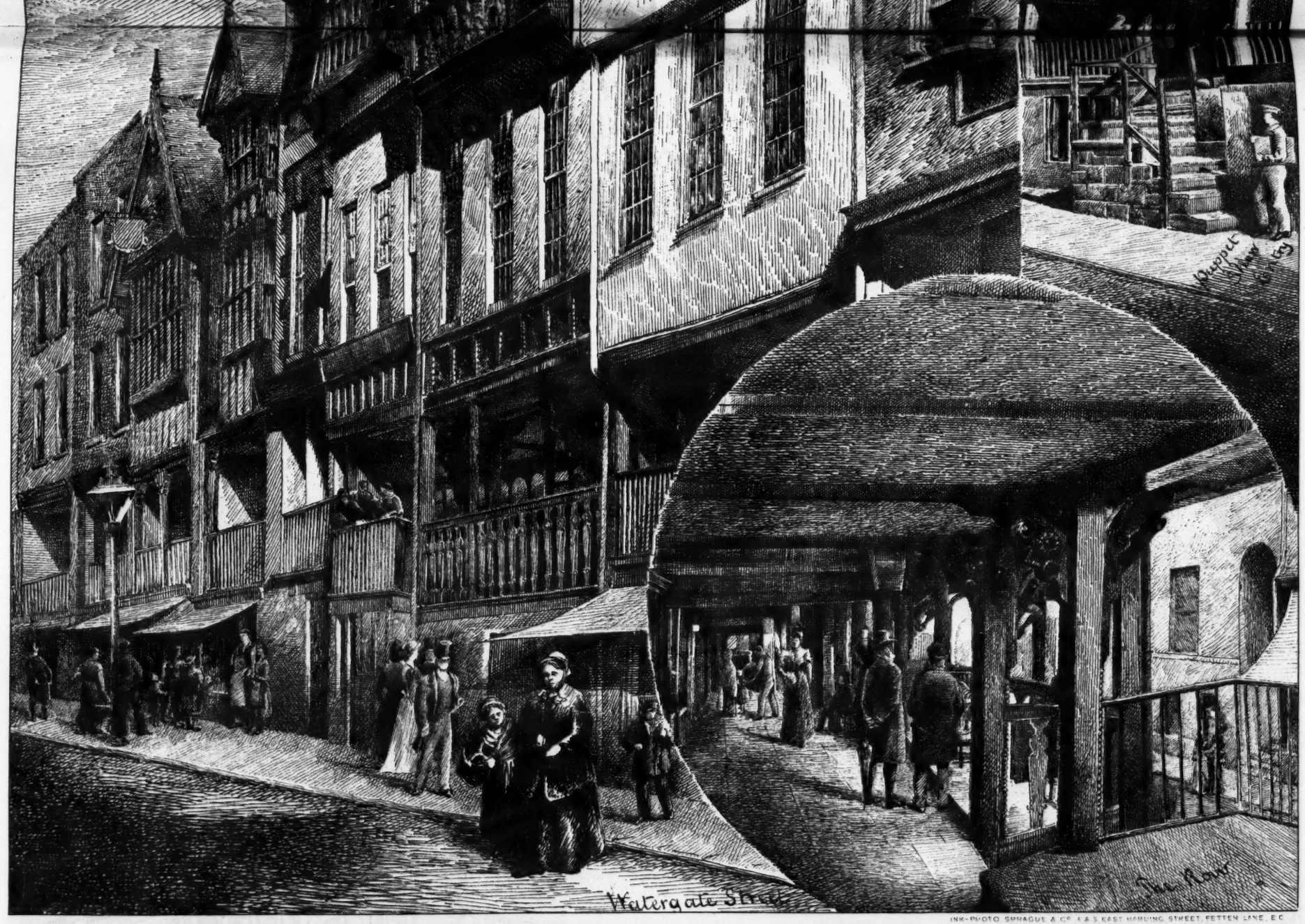

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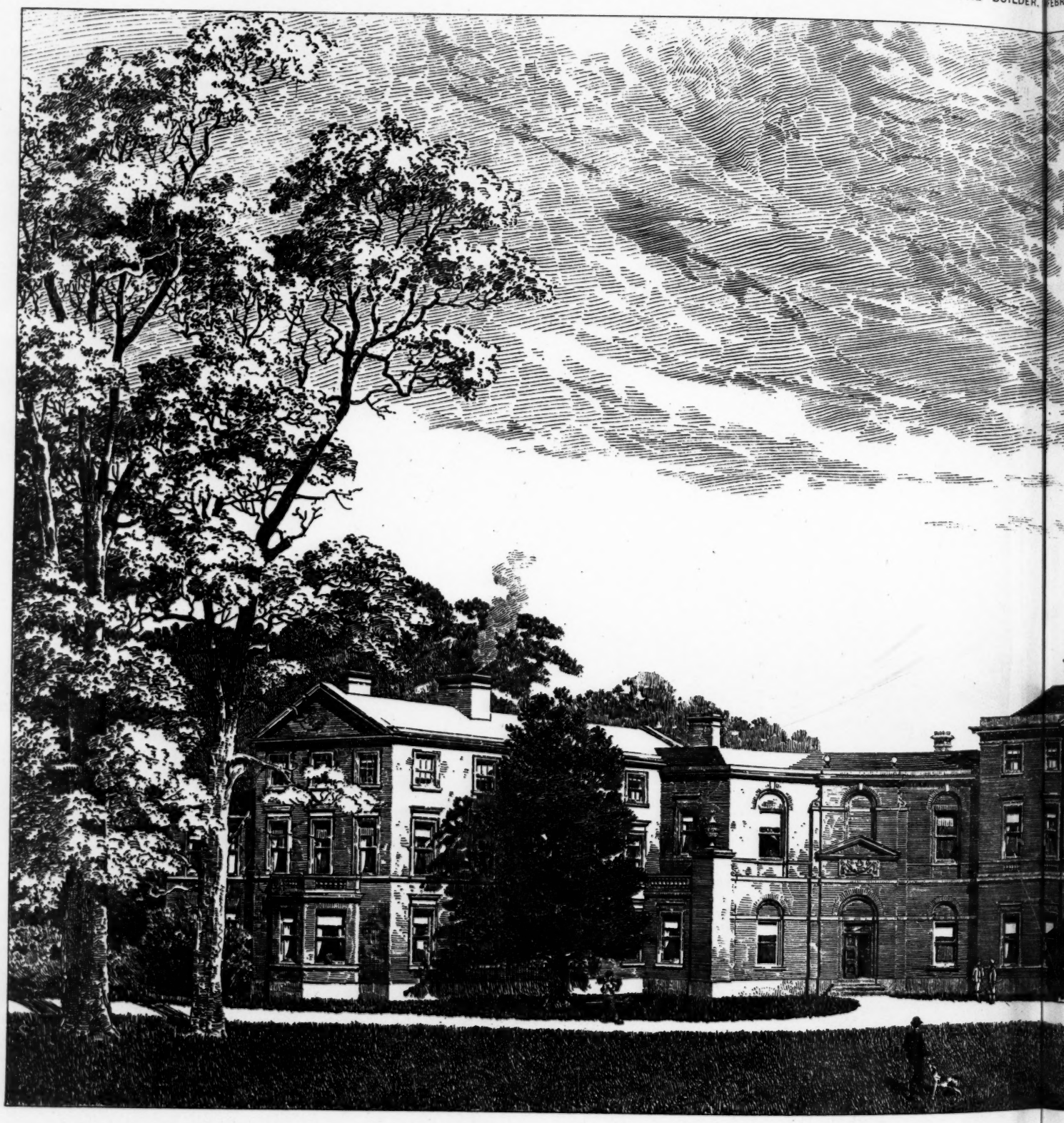

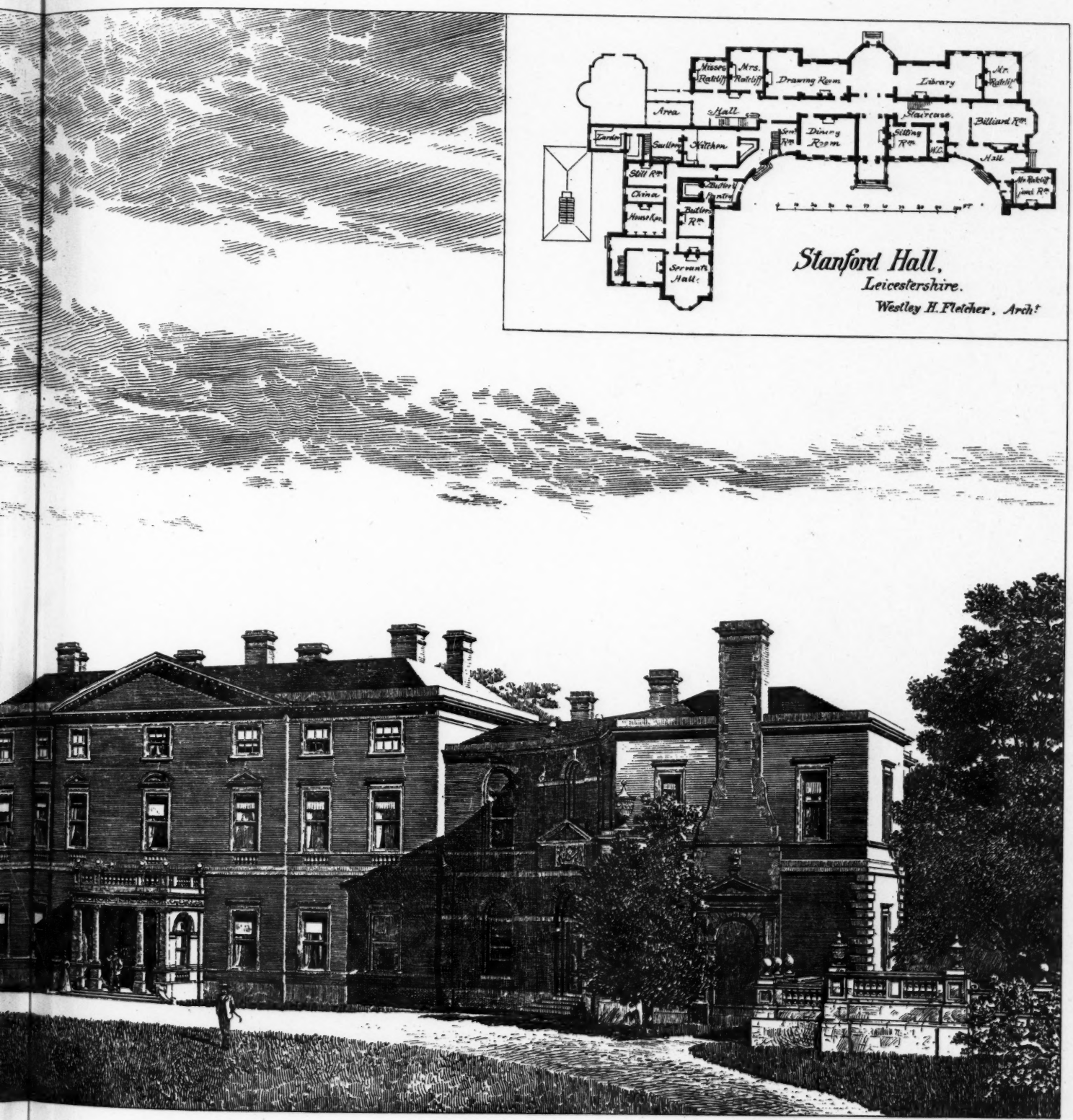

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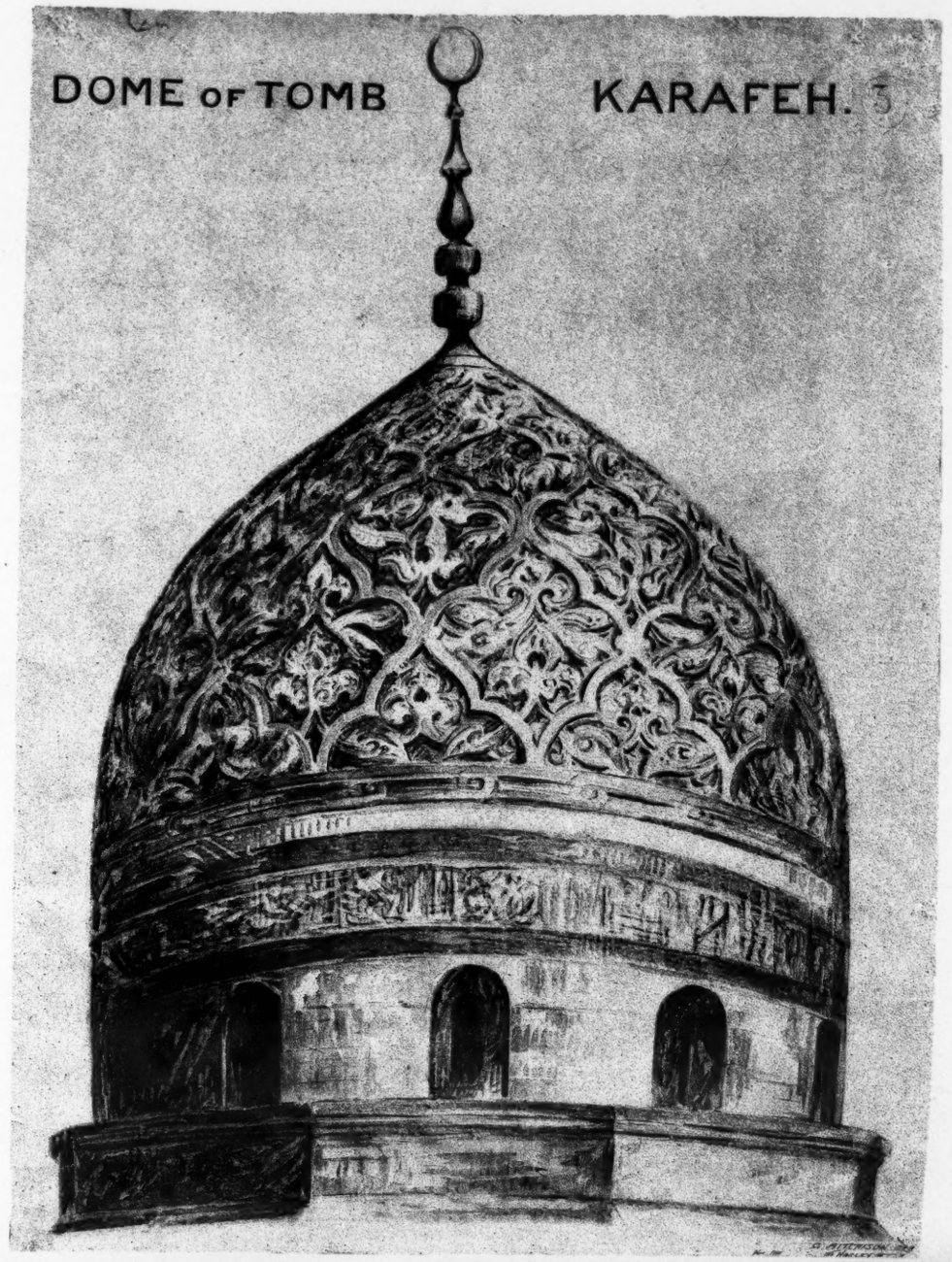

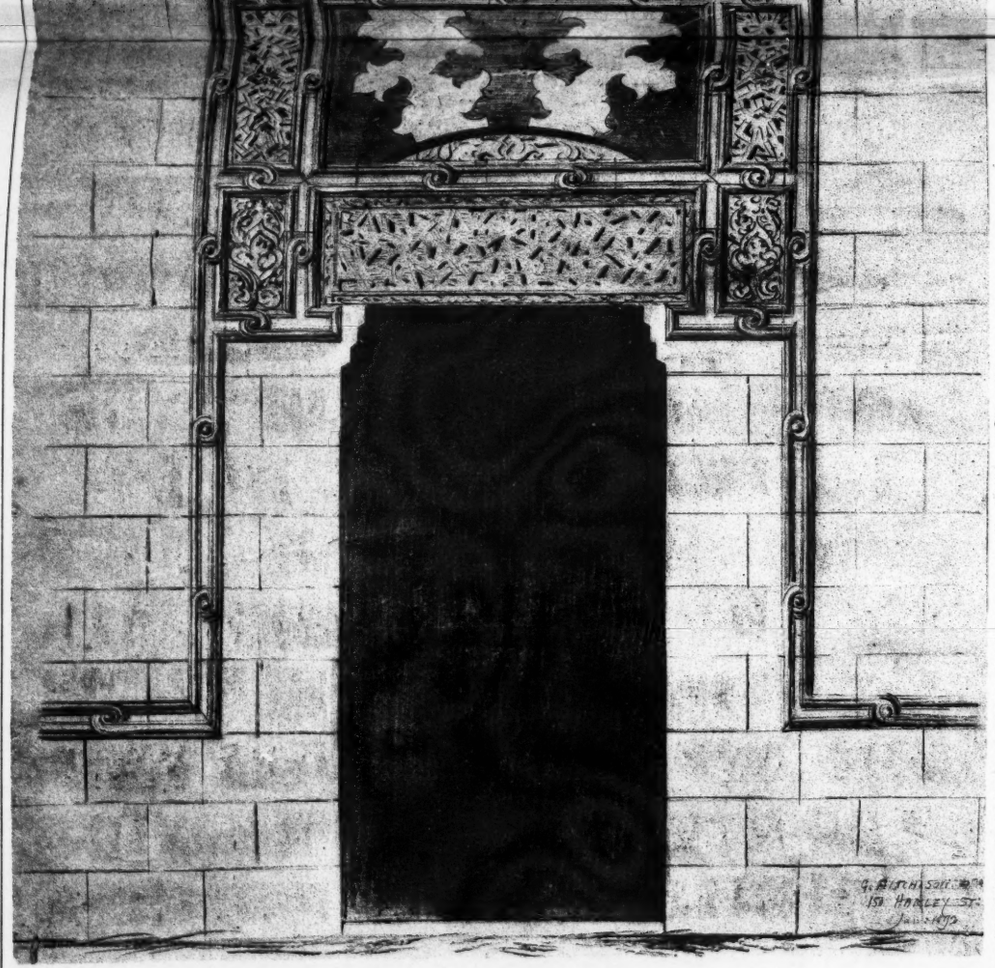

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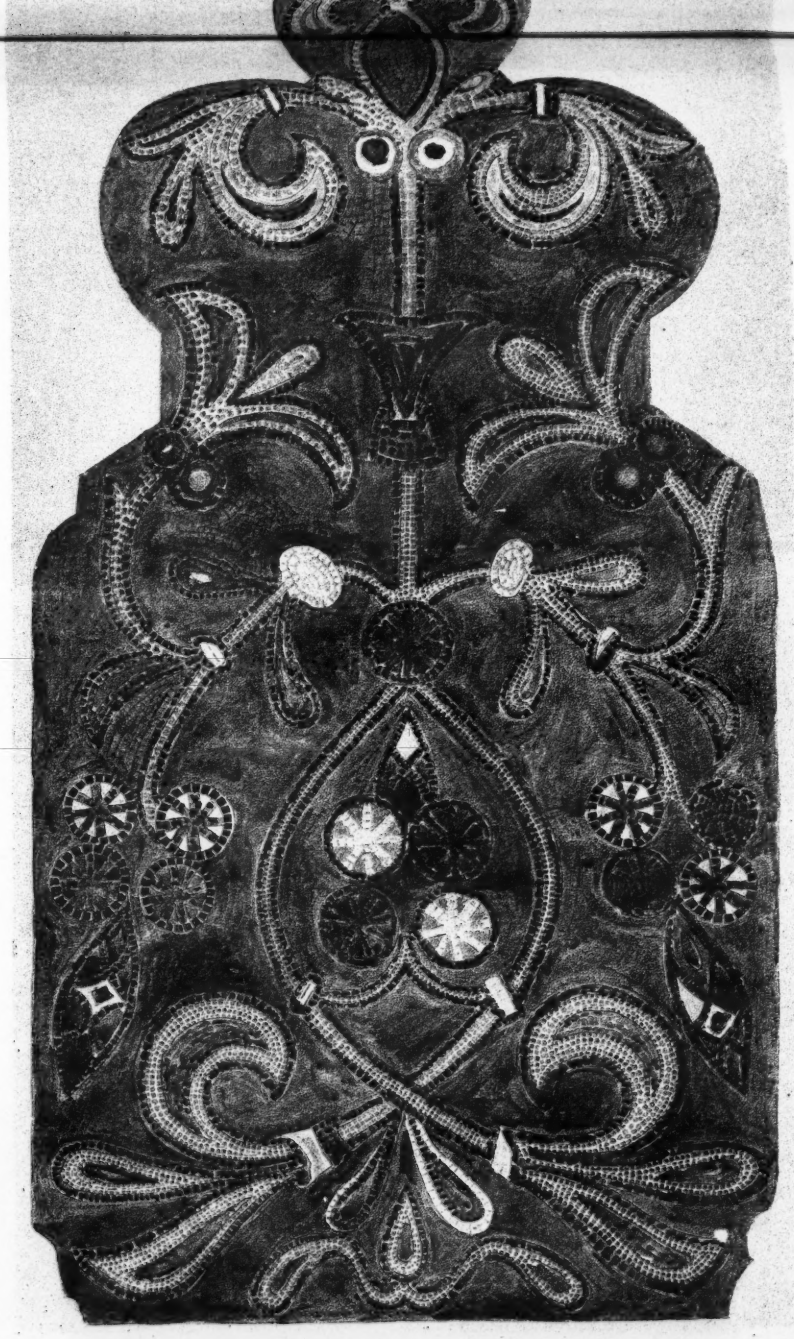

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